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[ICHIGAN HOSPITAL BUILDINGS.

TRANSACTIONS

OF THE

CLINICAL SOCIETY

OF THE

UNIVERSITY OF MICHIGAN

OCTOBER, 1912—OCTOBER, 1913

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the removal of what we are prone to term the primary focus, and a new growth is found in the same patient, we are undoubtedly correct in speaking of the second appearance as due to the process of metastasis. But what of the case that comes to us seven and ten years afterwards, or even longer, as has been true in my own experience? Shall we still speak of these cases as due to metastasis? I do not believe we are correct if we do so speak of them.

Double club-foot in the same individual infant is not uncommon. The same unseen, or better, the same unrecognized embryologic deformity (if it is this) in the skin, epithelium, muscles or bone must develop *de novo* from a stimulus, or its reverse, until we have again another recognizable mass that only a wide stretch of the imagination, it would seem to me, can attribute to a former growth that was removed over ten years before. In other words, to put it more simply, the appearance of a second malignant process ten years or over following the removal of a primary carcinoma, must be due to a new point of origin without reference to the previous growth.

But while the embryologist, the pathologist, the bacteriologist and the physiologic chemist are so patiently and so wonderfully mining out the problems this condition offers, the woman afflicted, together with her physician, are confronted with a situation that is as distressing, and too frequently is as hopeless of solution, as any question to be solved by members of the human family.

With the above dismal prelude, permit me to offer a method for your consideration, which, if it does not cure in the sense outlined above, certainly does offer in the way of relief a wider margin of probability than any other method of treatment for carcinoma of the uterus known today.

The value of the method depends on two things: first, the destruction of the gross mass of carcinoma in the uterus by the actual cautery heated to a little less than a dull cherry red heat. Second, this mass of heat is to be applied to the pathology involved until the whole pelvis, if possible, has the temperature raised to 120° Fahrenheit minus. The coagulation point of blood is 120° Fahrenheit.

The uterus needs to be made a charred lump, again, for two reasons: first, when the slough is thrown off, the shell that is left should become a cicatricial mass free from carcinoma; second, in order to get the requisite amount of heat in the outlying confines of the pelvis, it is necessary to slowly destroy the uterus. A high degree of heat cuts the tissues so fast that the temperature in the pelvis, as a whole, cannot be raised to the point where it is inimical to the further progress or development of the cancer germ or cell.

To remove the uterus, as this is understood when we do a hysterectomy with the knife, is not the thing aimed at. Heat diffused through the pelvis sufficient in degree to prevent the further development of the cancer cell is the thing to be attained.

Leo Loeb of Saint Louis, in a personal communication, stated that heating mouse carcinoma to 44° centigrade (111.2° Fahrenheit) for from fifty to sixty minutes in a water bath before inoculation, will kill the cells. He also stated that this sensitiveness for heat is similar in the case of sarcoma of rats. Doctor Loeb added further that tumor cells are much more resistant to the effect of extreme cold—they withstood in some experiments a temperature even as low as 25° (13° below zero) to 30° (22° below zero) centigrade below the freezing point for forty-eight hours.

As far as known, human carcinoma has not been successfully transplanted. If, however, cancer that develops in the human is affected as is the carcinoma of the mouse and rat by comparatively moderate chemic heat, such as is aimed at by the use of the cautery then we have in this method one that offers much more than does any purely surgical procedure so far devised. This use of heat diffused through the pelvis at a temperature of 49° plus centigrade (120° Fahrenheit), is the crux of the rational treatment today of uterine carcinoma. More than this I am convinced that this treatment, as outlined first as a serious procedure by Doctor John Byrne of Brooklyn, New York, must appeal not only to surgeons but also to physicians as offering far more in the way of prolonged relief than can possibly be obtained except under exceptional conditions by the use of the knife.

Indeed, I am assured by some of the best surgical practitioners in this country, who have read my paper in the *Journal of the American Medical Association* above referred to, that until we get a serum (if this is what it is to be) that will utterly annihilate a malignant growth through the channels of the blood, the method of Byrne, as improved by the present day technic, is the last reasonable word in the treatment of cancer of the uterus.

Doctor Byrne early recognized the utter futility of attempting to cure cancer in the region under discussion by the knife. In his address, as president of the American Gynecological Association in 1892, he gave this impressive advice:

"As operative surgery (in cancer of the uterus) is in many respects more dangerous than the disease for which it is undertaken, and as the majority of all patients afflicted with uterine cancer would live longer without than with it, it is not a safe or a useful operation, and, as such, is unjustifiable. * * * Amputation of a cancerous cervix by the cautery knife is free from danger, a safeguard against all infection, traumatic or septic, and what is of still greater importance, is destructive to latent cancer cell proliferation in tissues far beyond the line of incision; hence, much more is comprised in the operation than the mere removal of a part or parts, not more actively involved in the work of destruction. * * * Any method of operating, for which advantages so vital and so far reaching can be claimed and established, and which thus distinguish it from all others, renders its adoption on

the part of those who undertake to operate for cancer of the uterus no less than a moral obligation."

As will be observed, the basis of Doctor Byrne's method is a supravaginal amputation of the malignant cervix by a cautery knife, but his experience in doing this had also taught him incidentally to know that it was "destructive to latent cancer cell proliferation in tissues far beyond the line of incision."

In my early work with the cautery in cancer of the uterus, I made use of the ordinary small copper soldering iron with its four rather sharp edges and quadrilateral tip. I never had quite courage enough to attempt the supravaginal amputation of the diseased cervix as advised by Byrne. The close proximity of the bladder above and rectum below was the active cause of my dread.

In addition, a really practical, and therefore effective, cautery knife is a difficult instrument to make. The type of knife for this purpose used by Doctor Byrne, I have not found described in any of his writings. In all of the cases so far reported by me, I endeavored only to destroy the cervix and body of the uterus with the cautery and to leave in place of an active carcinomatous mass a healing, cicatrizing remnant. Medical men have known for a long time that the cancer was of slow development in cicatricial tissue.

My purpose in my early work with the cautery was to try to substitute the predominating epithelial elements peculiar to carcinoma of the uterus for fibrous or connective tissue cells. That I was successful in this is shown by the length of time that my patients lived in comparative comfort after the use of the cautery. True, this is not a record of brilliant achievements when compared with the operative results in nonmalignant growths of the uterus; but I venture to assert that it compares more than favorably with the ultimate operative end in cancer of the uterus, if the work of all who attempt surgery in this field with the knife could be known.

I early recognized, however, that to stick a red hot iron through the vaginal tube into an ulcerating mass that had extended in directions I had no means of determining, except by inadequate digital exploration, was neither good judgment nor good surgery.

In addition to this, I found that, as an after effect, the means used, namely, the excess of heat to destroy the pathology of the cervix or uterus, had also caused irreparable damage to the vaginal walls. The only solution of the problem, then, seemed to be to prepare the parts in the same way as for a combined abdominal and vaginal section with the knife.

It must appeal to everyone, whether he be physician or surgeon, that to shove a sharp knife or a red hot iron into living tissue without the guidance of either sight or touch is not likely to be for the best interests of the patient. This was the defect of the Byrne method of cauterizing the uterus that I believe I have largely overcome. Briefly

stated, the improvement consists in opening the abdomen, with the patient in a modified Trendelenburg position. This consists in the head of the patient, while on the table, being lower than the buttocks, while the feet are elevated and held by stirrups, as in the lithotomy position. This, as a rule, makes it unnecessary to pack off the abdomen with sponges, ridding as it usually does the pelvis of the intestines and in this way requiring only a suprapubic opening sufficient for the assistant's fingers to determine the amount of heat that is coming into the pelvis when the cautery is applied to the diseased structures through the vagina.

The gloved fingers of the assistant can usually stand a temperature of 110° to 115° Fahrenheit (43° to 46° centigrade) in the pelvis. The cautery heated to a dull cherry red gradually raises the temperature in the pelvic tissues until the limit of toleration for the assistant's fingers is reached. Another very great advantage of this access to the pelvis through a suprapubic opening is the knowledge obtained of the extent of the pelvic involvement, especially backward along the course of the ureters.

A further improvement was the means used to protect the vaginal walls from the excessive heat. I early learned that an asbestos covering on a tubular speculum was not only of but little protection against the heat, but it was also inefficient because usually too long and of too small diameter for the efficient use of the cautery. This was likewise true of the water-cooled speculum which had been devised for this work by a number of prominent gynecologists.

The principle of the vacuum bottle finally was suggested and it appealed to me as the most desirable form of speculum to protect the vaginal walls from the cautery, and in practice this has been found to be an ideal instrument, when correctly made. It must have a high vacuum and at the same time be made of the quality of glass that will stand a maximum degree of heat without cracking. This instrument, when used with the cartridge-shaped cautery iron which I use, makes a most efficient set of instruments for the proper carrying out of the technic of this method of treatment.

In my former paper, I recommended an electric cautery which I had had constructed in order to obtain a more uniform degree of heat, that could be controlled by a rheostat. Further experience with this instrument justifies my first good impressions based on its actual performance in the work demanded of it. It is a great satisfaction to have a cautery that will heat as we want it to heat or burn.

The cautery point is heated from a coil in the shaft of the instrument. This shaft became so hot that, when kept in my vacuum speculum too long, it would occasionally crack it. Recognizing the value of the electric cautery, I was compelled to devise a water-cooled instrument for this work that did not contain the defects for practical work found in those illustrated in the instrument catalogues. The Kny-

Scheerer Company, of New York, have made for me a water-cooled speculum which is an excellent instrument.

The surgeon who does not care to invest in the electric cautery and water-cooled speculum here described, can do most effective work with the cartridge-shaped cautery which is made for me in two sizes by Sharp & Smith, of Chicago. A set of these consists of three of each size, six making a very good number for practical work. They are heated in a gas stove. These, with the vacuum speculum which I have had made in two different sizes, do excellent work in the average case.

Occasionally, in women who are old and have not borne children for many years the vaginal canal is small and atrophied, and the use of any form of speculum of a size sufficient to do this work is impossible. When this difficulty presents itself, I have, in a few instances, succeeded in dilating the canal with my fingers (well lubricated with liquid soap) to a degree sufficient to insert my closed fist, as all of us have been compelled to do when practicing obstetrics. But, as in obstetric practice, this method is often slow and frequently painful to one's hand. Unlike an obstetric case, our patient is under an anesthetic and we cannot spend too much time in dilating the vaginal canal. In order to expedite this part of the procedure, I have had made for me, also by Sharp & Smith, a vaginal dilator which not only saves time but produces less traumatism than do attempts by the manual method referred to above.

One of the most difficult conditions to treat is where the vaginal walls are involved in the extension of the disease from the cervix. This forms the usually so-called squamous-celled carcinoma I have referred to elsewhere as the "infiltrating" type in contradistinction to the "vegetative" which grows outward and gives us the exuberant growths that are characteristic. This type of the disease can best be treated by raising the temperature in the vagina so that a thermometer in the urethra will register 115° Fahrenheit. The thermometer should be made at a right angle, as shown in the one I exhibit.

In the bad cases where the vaginal canal is almost closed by the growth, the finger in the rectum and the thermometer in the urethra gives one the only definite method possible of treating these cases. It stops hemorrhage and offensive discharge and arrests, for a time at least, the further progress of the case. There is no other method that offers anything whatever in this class of cases. The thermometer in the urethra prevents the destruction of the latter and yet permits a degree of heat to be applied that is effective, preventing, or at least retarding, the active progress of the disease. It is this class of extensive vaginal involvement cases in which the controllable current of the electric cautery does its most efficient work.

There are many more things that I would like to bring before you in describing this method of treatment, but lack of time and your patience forbid.

In closing, therefore, permit me to add that the assistant's fingers in the pelvis can push the carcinomatous mass down upon the cautery, he can and does warn as to the approach of the hot iron in the vicinity of the ureter and can direct the operator as to the necessity of pushing the cautery into the broad ligaments. The operator's fingers in the rectum can more efficiently guide the electrode posteriorly than can the assistant's fingers in the pelvis. The region of the rectum, especially in a fat patient, is often too far for the asistant's fingers to reach. In two or three of my cases, I have perforated the uterus with the cautery. I mention this to say that I had no untoward results from this, and in two cases where the abdomen was reopened for a recauterization, no pelvic adhesions were found.

Where the malignant process invades the bladder, I have purposely not considered that viscus. My only concern has been to develop a sufficient degree of heat to inhibit the further progress of the disease. If the sloughing process, which supervenes, involves the base of the bladder, I treat it as a mere incident for it is the lesser evil.

I have had three uterovesical fistulæ following the cautery. In one of these I closed the vaginal walls above and secured a perfect result. The two remaining patients are still alive; if they continue to improve, I will close their fistulæ in this way also, or remove the uterus from above by my electric cautery knife and do a plastic on the base of the bladder.

It requires about one hour to treat thoroughly a malignant uterus with the cartridge type of cautery heated in the gas stove made for heating these irons. The electric cautery requires about half this time.

One of the first results noticeable after the use of the cautery is the disappearance of the cachexia within two weeks. The skin becomes clear and healthy looking, the appetite returns, the pain stops, and with the disappearance of the hemorrhage and foul discharge, hope once more resumes its beneficent sway.

DISCUSSION.

Doctor Reuben Peterson: I do not think that Doctor Percy has been overenthusiastic in his advocacy of his cautery instruments in the treatment of carcinoma of the uterus, provided he limits their use to a certain type of cases. We have had about two hundred twenty-five cases of carcinoma of the uterus in the Gynecologic clinic during the past eleven years, a large number for one clinic. Unfortnuately it is only too true that the great majority, seventy-five per cent, have applied too late for radical treatment, and can only be benefited by palliative procedures, where I place the method of treatment advocated by Doctor Percy this evening.

I have tried treating the disease in these advanced cases by the application of pledgets soaked in a seventy-five per cent solution of zinc chloride. In a few instances the results have been remarkably good,

patients living five or six years after the applications. But the majority of patients, although improved temporarily, have died within comparatively a short time of a recurrence of the disease with its accompanying foul discharge and pain. So any treatment holding out prospects of bettering the condition of these unfortunate patients will appeal to any surgeon.

Undoubtedly the charring of the uterus, resulting from these powerful and effective cautery instruments, will result in extensive sloughs and the formation of granulation tissue after the sloughs have come away. Thus the patient will be cured temporarily, at least, of her foul discharge and pain. Eventually, however, the disease will return, or rather continue after a longer or shorter respite, and the patient die of the disease. But something will have been gained if her life has been made more comfortable.

Thus far I am able to follow Doctor Percy and agree with him. Not only that, but I shall be delighted to give his methods and his instruments a thorough trial in the clinic, since it looks to me as if his methods for the treatment of hopeless cases of cancer of the uterus are superior to those I have been employing.

However, if Doctor Percy means that he is to make use of his method in all cases of uterine cancer, irrespective of the extent of the disease, I am forced to take issue with him. For in certain cases of uterine cancer it is perfectly possible to so remove the uterus and the parametrial tissue that the disease is entirely eradicated, and will not return. It would seem to me a decided step backward to thus renounce the radical abdominal operation for cancer of the uterus, and set at naught the triumphs in the treatment of uterine cancer witnessed during the past fifteen years.

Doctor Percy mentioned a case of carcinoma of the uterus, where the latter protruded from the vulva and was removed with the knife with the result that the disease quickly returned. While the case is interesting, it proves nothing regarding the choice of operation in cases apparently similar. There are certain types of cancer of the uterus where no operative procedure will remove the disease, which, while locally not far advanced, has been carried high up in the pelvis by the lymphatics, making the case hopeless when first seen. On the other hand, then, the carcinoma is of the basal cell type, and with or without treatment the disease may progress very slowly and the patient last for years. An example of this type can be cited from our clinic, where some fifteen years ago a woman had a high amputation of the cervix for undoubted cancer, as shown by microscopic examination. She returned two or three years ago with a recurrence of the disease, which was treated palliatively. She has been back twice since with no particular progress of the disease.

It has been noted many times, by those who do the radical operation, that apparently hopeless cases will have no return while favorable

cases, where the disease is locally no larger than a dime, will have a quick recurrence. The same would be true if the latter were treated by the cautery.

I grant you that the radical removal of the cancerous uterus is a very severe operation, carrying with it under the best of conditions a mortality of at least ten per cent.

As regards the remarkable results from the use of the galvano-cautery in carcinoma of the uterus, published by Byrnes, while not detracting from the value of these results, I have been unable to find any reference to microscopic examinations. Under the best of conditions at least thirty per cent of the pelvic glands will show carcinoma and very few of such patients will be saved by any procedure.

I cannot conceive how a temperature of 120° from the cautery will have any effect on the pelvic carcinomatous glands. With the remaining seventy-five per cent, better permanent results can be obtained from the radical operation. So, while I give Doctor Percy all praise for his technic in the inoperable cases, it does not affect my position at all as regards the radical operation for uterine cancer.

Doctor Howard H. Cummings: I was glad to have the privilege of seeing Doctor Percy perform the operation this afternoon. Examination of the patient previous to operation revealed a large uterus, badly involved, and on the left side was a mass about the size of a hen's egg, very firm and nodular. There was infiltration in the bladder region and near the rectum. The remarkable thing to me was that, with the cautery in this mass for about forty-five minutes, I could stand it to have my hand on the anterior wall of the uterus, and only once was the heat uncomfortable and that was when the mass on the left was treated. As the cauterization proceeded, I noticed the apparent softening of the uterus. Of course, it did not soften but the thin shell remaining gave this sensation, and I could tell where Doctor Percy was working at any time during the operation. This operation certainly seems rational for inoperable cases. I was very much pleased with the result. Tonight the patient is fairly comfortable. I saw her before coming here, and she complained of severe pain and was given one-quarter grain of morphin. The pain was in the right thigh.

I am very anxious to follow this case while she is in the hospital, and if she returns, to see the result. However, I hope she will not have to return.

Doctor Percy (closing): I have not said that this operation should supersede the Wertheim operation in selected cases. We know that cancer in other regions of the body is undoubtedly a local disease. The Wertheim operation, in the hands of the average operator, is nothing more nor less than legalized assassination. In my first paper, which I read before the Western Surgical Society, I made the statement that these cases should be turned over to men like Doctor Peterson, Doctor Ries of Chicago, and others who have made a careful study of this technic.

Doctor Cummings spoke about the patient we operated on this afternoon coming back to the hospital some time in the future. I had a patient who had bleeding and a foul discharge for three years. Like many patients, she had hidden it from the family. This woman came back three times, and was treated. At the present time she has a recurrence of the growth, showing a nodule on the tip of the cervix.

In this case today, Doctor Cummings suggested that he still felt a ring of cervical tissue, so I cauterized it thoroughly, but if the patient should come back, you could still repeat this method. It will do no harm.

I cannot answer Doctor Peterson yet, when he suggests that this method will not reach the glands involved or the metastases in the outer region of the pelvis. I do not know whether it will or not, but trust that it will.

Now, as to the after-treatment, I have had some of my patients up the second day after operation. I think they progress more rapidly this way. I was interested in what Doctor Cummings said about giving the patient a quarter grain of morphin. I think a sixteenth of a grain is enough. I cannot believe that there are any nerves remaining to give the sensation of pain, and it has been a routine method of mine to give not more than one-sixteenth of a grain with instructions to the nurse to repeat it in an hour if necessary, but it is quite interesting to see how few of the cases have the second dose. I think we get into the habit of using the one-quarter grain because the druggist gives them to us in this dose.

REPORTS OF CASES.

A REPORT OF TWO CASES: ONE OF MULTIPLE EPITHELIOMATA; ONE OF PEMPHIGUS VULGARIS.

UDO J. WILE, M. D.
Department of Dermatology.

THE patient in the first case is seventy-three years old, by occupation a farmer. There is nothing in his family history which has any bearing on his condition. In his past history it is interesting to note that he has been exposed to the sun and the elements all his life. Ten years ago a growth appeared on the right side of the face which was removed at that time and has not recurred. In 1909 Doctor Breakey removed a growth from the right cheek which had been present one year, and last year Doctor Breakey removed a small growth at the outer angle of the right eye where you see an excellent cosmetic result was obtained. Some six weeks after this a third growth was removed from the left side in the surgical department by a radical excision. The present tumor developed after the scar of the surgical operation, and has grown very rapidly since. Subjectively the patient notices a rather continuous itching.

I should like to point out some very interesting features in regard to this case which I think have a bearing on the possible etiology, at

least of cutaneous cancer. You will notice on examining this patient that the lesions are of four types. They are, first, lentigines, or ordinary freckles and more diffuse pigmentation, unquestionably due to the exposure to the sun; secondly, telangiectases; thirdly, keratoses; and fourthly, numerous keratoses which have undergone malignant degeneration, of which the largest is this typical epithelioma of the face. It has always impressed me as a significant fact that epitheliomata are so very common in those exposed to the sun. Perhaps I should say that those exposed to the sun and the elements are very prone to precancerous changes. It would seem in such cases as though there had been a sensitization of the epithelium resulting in an overstimulation of the epithelial tissue. All these changes which are seen in this patient are in no wise different from those which could be artificially produced by exposure to the *x*-ray or other radioactive agents.

On examination, you will notice that the growth is rather firmly attached to the underlying periosteum and the prognosis for eradication is not very bright. I propose, however, to remove this and the other tumors by means of deep curettage, following this by application of acid nitrate of mercury, after the method of Sherwell, and I shall hope to report at a later date the result of the treatment in this case.

* * *

It is rather remarkable that in the first forty cases which I have seen at this clinic, one should have been an example of one of the rarest dermatoses which we know—pemphigus vulgaris. This patient is forty years old, by occupation a machinist. He came to the University Hospital complaining of sore mouth and sore throat. There is nothing in his family or past history of any bearing on the present illness. In April, 1912, the patient first noticed that blisters formed in his mouth and throat. At that time, however, no blisters appeared on his skin. He came to the hospital on June 15, and was treated in the Otolaryngologic department locally and with entire amelioration of symptoms. He returned to us on the 30th of September, at which time the mouth, pharynx, and larynx were covered with large ulcerated bullæ. The entire nasal mucosa was involved. There had been a loss of eighteen pounds in weight. Patient was unable to take any nourishment and his condition was rather a serious one. In addition to the mouth lesions there was, as you may see, a large group of rapidly ulcerating bullæ under the right axilla and scattered bullous lesions all over the trunk. These rapidly became pustular, ruptured and left raw ulcerated surfaces. An examination of the patient's blood shows a moderate leukocytosis, and, as is the rule in this case, a rather marked eosinophilia.

The etiology of pemphigus is still an obscure problem. In general, it may be said to affect adults in the fourth or fifth decade; as a rule males more frequently than females. The course of the disease is, as a rule, rapidly fatal. The patients die of amyloid changes or from absorption of toxines from the open wounds, at times from hemor-

rhages from the internal viscera which are regularly involved late in the disease, or they succumb to terminal infections. They may, however, run a more chronic course in which event one of two things generally occurs. The entire skin may eventually be denuded and a condition of constant exfoliation set in. This constitutes the so-called pemphigus foliaceous. This may last for a number of months and even a few years, but as a rule ends fatally within a short time. On the other hand, these raw surfaces may become infected and vegetate. Particularly is this true when the lesions are situated in the axilla and groin. This gives rise to a condition known as pemphigus vegetans. The vegetations reach the thickness, at times, of half an inch or even more. They are extremely foul, secrete large amounts of stinking pus and this condition is even more deplorable than the acute stages of the disease. Such patients, of course, do not survive very long and their exitus may be due to any one of a number of causes.

You may have noticed in the patient just shown that the lesions in the axilla already show signs of vegetating and it is highly probable that this case will become one of pemphigus vegetans.

Therapeutically, arsenic is the only drug which seems to have any definite effect either upon the course of the disease or the appearance of the bullæ. This patient is given daily injections of a four per cent solution of sodium arsenite, and I shall try, as has been suggested by others, a large dose of arsenobenzol as giving a possible chance of benefiting the condition.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, NOVEMBER 6, 1912.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

A CASE OF PULMONARY TUBERCULOSIS WITH MEDIASTINAL COMPLICATIONS.

MARK MARSHALL, A. B., M. D.
INSTRUCTOR IN THERAPEUTICS IN THE UNIVERSITY OF MICHIGAN.
ANN ARBOR, MICHIGAN.

AN inflammatory condition arising in the mediastinum during the course of a chronic pulmonary tuberculosis would seem such a natural sequence of events as to be scarcely worthy of a detailed report. However, in the particular case which I wish to present to this meeting, there has been so much doubt in the minds of the various attending physicians as to the exact nature of the mediastinal condition and so many interesting questions of diagnosis have been raised that I believe the case well worth reviewing, even though it may be impossible to arrive at a definite pathologic diagnosis. The accurate diagnosis of mediastinal conditions is difficult, and postmortem examinations reveal many utter failures of diagnosis in this region. Mediastinal cases are therefore interesting ones for speculation, but are often misleading unless properly checked by autopsies.

The patient is a male, aged forty, and a timber estimator by trade. He always regarded himself as quite a healthy man before the present trouble began, though he says he had night sweats ten years ago, which were attributed to "stomach trouble," and there is also a history of a "hacking cough" for the past few years. He first came under medical observation for his present trouble two years ago when he consulted Doctor Darling in regard to a tender swelling at the juncture of the

manubrium and body of the sternum which he had noticed three weeks before, and which he attributed to a strain he had received five weeks before when "catching on a moving train." At this time there were no lesions noted in the lungs. Heart normal, urine negative. The tumor mass was aspirated and two ounces of creamy pus removed which, on microscopic examination, was found to be free from germs of any kind. The following day the mass was opened and drained. Six weeks later he returned with night sweats and subcutaneous spread of the abscess below the wound. At this time the wound was laid open and curetted freely and provided with permanent drainage. The patient reacted to a subcutaneous tuberculin test and the tissue removed from the abscess was of a tuberculous nature. A note on March 1, 1911, three months after the appearance of the abscess, states that "there is no temperature, very little night sweats, and wound is healing nicely. Heart rapid; weight stationary." The sinus continued to heal very slowly and nine months after its first appearance was entirely healed. Patient felt well and had gained twenty-five pounds in weight. About the time the sinus closed, patient noticed swelling of feet. About this time, also, he experienced some difficulty in swallowing. "The food seemed to stop," as he expressed it. This complaint, however, did not last long. A little later, he experienced marked shortness of breath on exertion, for which he consulted a physician who discovered fluid in the left pleural cavity and in the abdomen. The pleural fluid was removed by aspiration. Following the removal of the fluid, his breathing was greatly improved and the edema left his feet and legs, but returned with a return of the pleural fluid. The chest has been tapped every three to four weeks since and it was found necessary to tap the abdomen for the first time last June, at which time eight litres of fluid were removed. More recently, the ascites has not been so marked.

During the past year the patient has presented various degrees of this picture of dyspnea, cyanosis, generalized edema with hydrothorax and ascites. He was seen in April of this year by Doctor Billings of Chicago who writes that "he presented at that time evidences of broken heart compensation with fluid in all the cavities of the body, scant urine, et cetera." A consulting physician who saw the case at the same time attributed the condition to a venous stasis from pressure upon the vena cavæ.

I first saw the patient three weeks ago with Doctor Darling. At that time he presented an emaciated appearance, was quite short of breath, slightly cyanosed and had edema of the feet and ankles. The veins of the neck were distended but showed no abnormal pulsations. He coughed a great deal but raised very little. There were signs of fluid in the left pleural cavity. The abdomen was distended and contained some fluid. The pulse was rapid (120 per minute) and of low tension (85 millimeters). The afternoon temperatures ranged from 99.2°-100°, and were subnormal in the morning. The heart was displaced to the right so that it occupied a median position in the chest.

The percussion outline showed no enlargement. The sounds, while not loud, were not muffled and there were no murmurs. There was no unusual distention of the veins of the legs nor enlargement of any of the superficial veins of the abdomen. Along the lateral chest wall of either side there was a vein draining into the axilla which was moderately enlarged. The breathing was almost entirely abdominal and there was inspiratory retraction of the interspaces of the lower thorax on either side, particularly on the right. The lower end of the sternum was also slightly depressed with each inspiratory effort. There was no change in the radial pulse with inspiration. There was marked dullness of the lower left thorax with signs of fluid. There was diminished resonance throughout the lower right side with other signs of consolidation. At the level of fourth rib in front on right side there was marked hyperresonance with the auscultatory signs of a cavity. The breath sounds were diminished on lower right with numerous fine and coarse crackling râles. The abdomen was moderately distended and tympanitic except in flanks. On percussion the liver was enlarged downward but the edge was not distinctly palpable and not tender. The leukocyte count was 10,640; hemoglobin 65 per cent (Sahli); urine negative, though previous to this time patient says there have been casts and traces of albumin. The fluid which was removed from the pleural cavity had the characteristic albumin content of an inflammatory exudate to which had been added a transudative fluid. The ascitic fluid, however, was purely a transudate. Guinea-pigs have been inoculated with the pleural fluid both here and at Chicago with negative results, and no organisms could be found microscopically. Sputum could be obtained for examination on but one occasion and this was negative for tubercle bacilli. A skiagraph of the thorax was made which showed a widening of the mediastinal shadow. The heart was poorly outlined but could be seen displaced to the right either by the presence of the left pleural effusion or by adhesions and contracture of the right lung. The right lung shows a marked fibroid change with cavity formations.

In attempting to discover a pathologic basis for this clinical picture of dyspnea, cyanosis, edema, hydrothorax, and ascites, one that will satisfactorily explain all of the features of the case both past and present, one would have to consider the following morbid processes:

(1) Indurative mediastinitis, with resulting obstruction to the venous return.

(2) Myocardial degeneration.

(3) Mediastino-pericarditis; the clinical picture resulting from the adherent pericardium.

In considering the first of these conditions, that is, indurative mediastinitis with venous obstruction, we find certain points in the history which seem to favor this diagnosis. First, the vascular disturbance was coincident with the healing of the mediastinal sinus and with

a general improvement in the patient's condition, which fact would suggest some mechanical interference with the circulation incident to cicatricial contractions following the closure of the suppurating sinus. Second, at this time also there was noted difficulty in swallowing which would suggest involvement of the esophagus by the indurative process. Third, The transient edema of the face noted in the morning might also suggest venous obstruction, since edema which is first noticed in the face is unusual except in nephritis, and there was no evidence of renal disease. Localized facial edema is occasionally found, however, in chronic pulmonary invalids. The points against a mechanical venous obstruction being regarded as the sole etiologic factor in the case are the absence of an intense cyanosis, either general or local, and a marked venous engorgement, both prominent features in such cases.

A consideration of the second possibility, that is, myocardial degeneration, brings us to an investigation of the history of the patient for a possible cause of myocardial disease, and the only thing to be noted here is a possible long standing pulmonary tuberculosis. Pulmonary invalids, however, do not exhibit myocardial symptoms resulting from the tuberculosis until they have reached a more advanced stage than that shown by this case at the time the present trouble developed.

The third possibility, that is, mediastino-pericarditis, to me seems the most probable diagnosis in view of all the facts.

In reviewing his surgical history, we have every reason to believe that the abscess over the sternum involved the mediastinal tissues, that there was a mediastinitis. And that this was evidenced by the apparent involvement of the esophagus and veins draining the head. The question as to the existence of an adherent pericardium is a more difficult one to decide,—particularly so since none of the classic signs of this affection are present. Neither the Broadbent, the Kussmaul, nor Friedreich's signs have ever been observed. Nor was there a pulsus paradoxus. These signs, however, must be very inconstant for so few cases of adherent pericardium are recognized before the autopsy. An indurative mediastinitis, without pericardial adhesions is, according to Harris who has made an extensive study of the condition, very rare. In the case under discussion the whole sternum is fixed by inflammatory adhesions and it would be difficult for the pericardium to escape. We have further evidence of pericardial adhesions in the fact that the patient has presented all the symptoms of heart failure without any demonstrable heart lesion or anything in his previous history pointing to cardiac disease, a fact which, according to Fenton and Theodore Fisher, should always suggest the possibility of pericardial adhesions.

I would make, therefore, a diagnosis in this case of mediastino-pericarditis. To what extent the clinical picture may be influenced by the indurative mediastinitis, by the adherent pericardium, or by a coincident or resulting myocardial degeneration, it would be impossible to say. In the twenty-five cases reported by Harris in which his careful study was supplemented by postmortem observations, it was impossible

to determine the relative importance of these various factors as causes of death.

In summing up this case, I would say that his trouble began as a pulmonary tuberculosis, as evidenced by the night sweats ten years ago, and by his hacking cough of more recent years, as well as by the fibroid change shown by the skiagraph. Whether the mediastinal inflammation is a sequel to the lung condition, through infection of the mediastinal glands, or whether there was first a pericarditis with a secondary mediastinitis cannot be decided here, but it is evident I think that the primary affection was in the lung.

The first case of mediastino-pericarditis was observed in the clinic of Griesinger in 1854, and was reported by Widenman in 1856. It is of interest to note that Griesinger commented upon a peculiarity of the pulse in his case, a peculiarity which is now known as pulsus paradoxus, though it was not until 1873 that Kussmaul, overlooking the previous observation of Greisinger, reported three cases of mediastino-pericarditis, emphasizing the pulsus paradoxus as an important diagnostic sign. Rosenbach made an interesting study of two cases calling attention to a possible pathologic relation between adherent pericarditis and enlarged liver in cases with ascites as a dominant feature. He noted in connection with these cases a proliferative perihepatitis which he regarded as similar to the pericardial inflammation and considered it also as a possible cause of the ascites. It required, however, the more exhaustive study by Pick in 1896 to attract sufficient attention to this condition to permit of its being classified as an independent affection named by Pick, pericarditic pseudocirrhosis. By far the most satisfactory account of mediastino-pericarditis was given by Thomas Harris of London, in 1894, in a comprehensive review of twenty-five cases with autopsies. Since Harris' article there have been a number of cases reported in the literature, though very few from this country.

An article by Cobb of Boston, in the October number of the *Annals of Surgery,* deals with a very interesting case of chronic indurative mediastinitis without symptoms that came under observation for the first time with acute abdominal pain and tenderness which lead to a diagnosis of acute peritonitis for which the abdomen was opened. From the postmortem finding in this case Cobb concludes that the pain and tenderness was due to sudden stretching of the capsule of the liver from venous stasis incident to an acute pericarditis.

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DISCUSSION.

DOCTOR JAMES G. VAN ZWALUWENBURG: I saw the patient about two weeks ago. I was asked whether it would be possible to tell anything about the cardiac relations. I said that by observing the heart with the orthodiagraph we could tell which chambers were affected and how, and that we could recognize retractions. But I have never seen a patient quite so dense to the *x*-ray as this one. With a strong current and a good tube of fairly high vacuum one could hardly get a glimmer of light through the chest. It is one of the instances where the value of radioscopy is limited.

DOCTOR ALBION W. HEWLETT: I have just made a brief examination of the patient outside and have therefore missed Doctor Marshall's discussion of the diagnosis. The history would lead one to suspect a mediastinitis. In addition the fixation of the lower part of the chest and the cardiac insufficiency are such as one commonly gets in chronic mediastinitis especially when associated with chronic adhesive pericarditis. Whether or not the latter condition exists is difficult to say but for practical purposes it makes little difference for the mediastinitis alone might interfere with the heart's action. From the standpoint of therapeutics the important question is whether an attempt should be made to resect a portion of the body thorax so as to relieve the heart of the mechanical interference with its action. The prognosis with medical treatment is very poor. It seems to me therefore that the question of operation should be put up to the patient, and should he be

willing to take the chances of an operation with all its dangers it should be done.

Doctor Cyrenus G. Darling: I am very much obliged to Doctor Marshall for the very careful way in which he worked out the findings. This case came back to me after two years. There was no question about the sinus passing down to the mediastinum from the abscess above. There had been, before I saw the man, a diagnosis of sarcoma from the slow manner in which it developed and from the hardness, but this was very thoroughly ruled out. The question of operation in this case is one that I am pleased to receive encouragement on, and perhaps I may receive enough encouragement so that I may, with the consent of patient, go ahead with the operation.

Doctor Marshall (closing): In regard to Doctor Hewlett's suggestion to perform a cardiolysis, I was of the opinion that, unless the pericardium were adherent to the heart itself, an operation would be of no avail, and it was on account of this understanding that I wished particularly to settle the question of adherent pericardium.

In regard to the question of hypertrophy which Doctor Schmidt asked, in cases where the pericarditis is tuberculous, there is no hypertrophy as a rule.

REPORT OF INTESTINAL PARASITE UNUSUAL IN THIS LATITUDE.

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The interest in the following case lies largely in its infrequency in this state and the danger of confusion in the diagnosis by mistaking a comparatively harmless parasite for the Necator Americana (the American murderer).

History.—R. S., an Armenian student of twenty-six years, came to the University Hospital for vomiting and alternate constipation and diarrhea. He lived in Armenia until twenty-two, when he moved to Egypt. Two years later he returned to Armenia and a year after this came to America, living in Boston for two years and coming to Ann Arbor one year ago. For the past summer, he has been working on the power dam being constructed immediately above Ann Arbor, and opposite the Ann Arbor waterworks.

His present complaint dates back about a year and consists mainly in distress after eating, usually three or four hours. During the last week he has had several vomiting spells, coming on about 3:00 or 4:00 o'clock in the morning. During the summer he has lost seventeen pounds. Bowel symptoms have not been conspicuous, the diarrhea being only occasional.

In the routine examination of the stool, a large number of motile round worms were found, which have all the characteristics of the

larvæ, which will be described later. In addition, Entameba coli were also found. There was little or no anemia; the blood count showed 7,500 white cells, of which six per cent were eosinophiles. Stomach contents revealed an absence of hydrochloric acid, but no other pathologic findings.

To avoid confusion in the following discussion, I have prepared the accompanying rough diagram, showing the relative dimensions of Strongyloides intestinalis in the various stages. No attempt has been made to produce an accurate drawing or to represent their more minute morphology.

Strongyloides apparently has two distinct phases in its life cycle, the one parasitic and the other as a "free living" organism, outside the body of the host. Beginning with the adult parasite (a) we find a female nematode about 2.2 millimeters long living in the upper portion of the small intestine. The anterior portion of the slender worm tapers gradually until its widest portion is in the last quarter of its length and terminates in a rather obtuse tail. A long slender muscular but non-striated esophagus opens directly from the round and unarmatured mouth, extending for about one-fourth the length of the body, where it becomes continuous with the straight intestinal tube, terminating in the anus, near the extremity of the tail. The intestinal tract is almost completely obscured by the large bilobed uterus, containing from twelve to eighteen ova in various stages of development. The two lobes extend in opposite directions and are bent upon themselves something like hairpins, and since the largest ova lie nearest the vulva, and they decrease in size in both directions, the effect is something like a necklace coiled within the body of the worm. The most nearly mature ova contain almost perfectly developed embryo which apparently escape from the cell immediately after the eggs are discharged, since the living eggs appear only in the immediate neighborhood of the female and never in the stools except in what is apparently an arrested state of development. When such eggs are found in the dejecta, they are usually arranged in strings of two or three, in a rather advanced stage of development.

No evidence of male sexual organs have ever been found in these parasitic females, nor has a sexually mature male been found in the intestinal contents. It appears then that this generation is made up entirely of the female forms, and reproduction is probably not by hermaphroditism analogous to that of Ascaris nigrovenosus but by true parthenogenesis.

The freshly hatched embryo (b) is about .33 millimeters long and is found in the intestinal tract and in the fresh dejecta. This is the form which was discovered in the case here reported. They are very active at ordinary temperatures and slightly exceed in length the diameter of an ordinary high power microscopic field. They are rather plump nematodes with a rounded head, taper gently to the greatest

diameter at about half its length and terminating in rather a bluntly pointed tail. The body appears finely granular throughout but shows its internal structures fairly well. The mouth cavity empties directly into an esophagus having two bulbous enlargements, which extend for about one-fourth the length of the body. These structures can be seen to move when the animal is feeding. This form of esophagus is characteristic of a large family of nematodes, including the rhabditidæ, and for this reason this stage of the embryo is commonly known as the rhabditiform larvæ. The esophagus is continuous with the long straight intestinal tube, terminating in the anus, not far from the end of the tail. About one-half the length of the animal, there is a small hyaline structure, somewhat distorting the otherwise straight course of the intestine, which represents the "anlage" of the reproductive organ.

When stools containing this form are incubated at ordinary temperatures, the embryos moult several times. In the course of four or five days, on their emergence from their cuticle, the appearance of the embryo is entirely changed. It has grown in length but has suffered a reduction in diameter, producing a long slender nematode (c). Incidentally the esophagus has lost its bulbous enlargements, is of uniform caliber, much narrower than before, very delicately striated and extends fully one-third to one-half the length of the body. This feature is characteristic of the family Filariadæ and accordingly the embryo is known now as the filariaform embryo. Instead of the bluntly rounded tail of the form (b), it now has a very slender tail, which on superficial examination appears to be truncated. Careful examination, however, shows it to be delicately notched.

After growing to a maximum length of .70 or .80 millimeters sexual development appears, leading to the fully differentiated males and females (d). Of these the male is the smaller, a comparatively plump round worm with a short straight esophagus and large sexual glands. Its most striking characteristics are the chitinous hook-like spicules, one of which is located on either side of its anus. These are introduced into the vulva of the female and serve to fix the latter during copulation. These structures sharply distinguish strongyloides from the large order of strongylidæ (to which Uncinaria belong), the males of which are furnished with a more or less well developed caudal bursa, known as the bursa copulatrix.

The female of this generation except in size and proportions, closely resembles the parasitic female (a). The uterus, however, contains fewer eggs, rarely more than eight, which usually hatch within the uterus, the last embryos to hatch apparently subsisting on the body of the dead mother worm.

The larvæ (e) developing from this diecious generation, are in every way similiar to form (b) and develop into filariaform embryos, (f), which cannot be distinguished from those of the previous generation (c).

Forms b and e have been repeatedly mistaken for the embryos

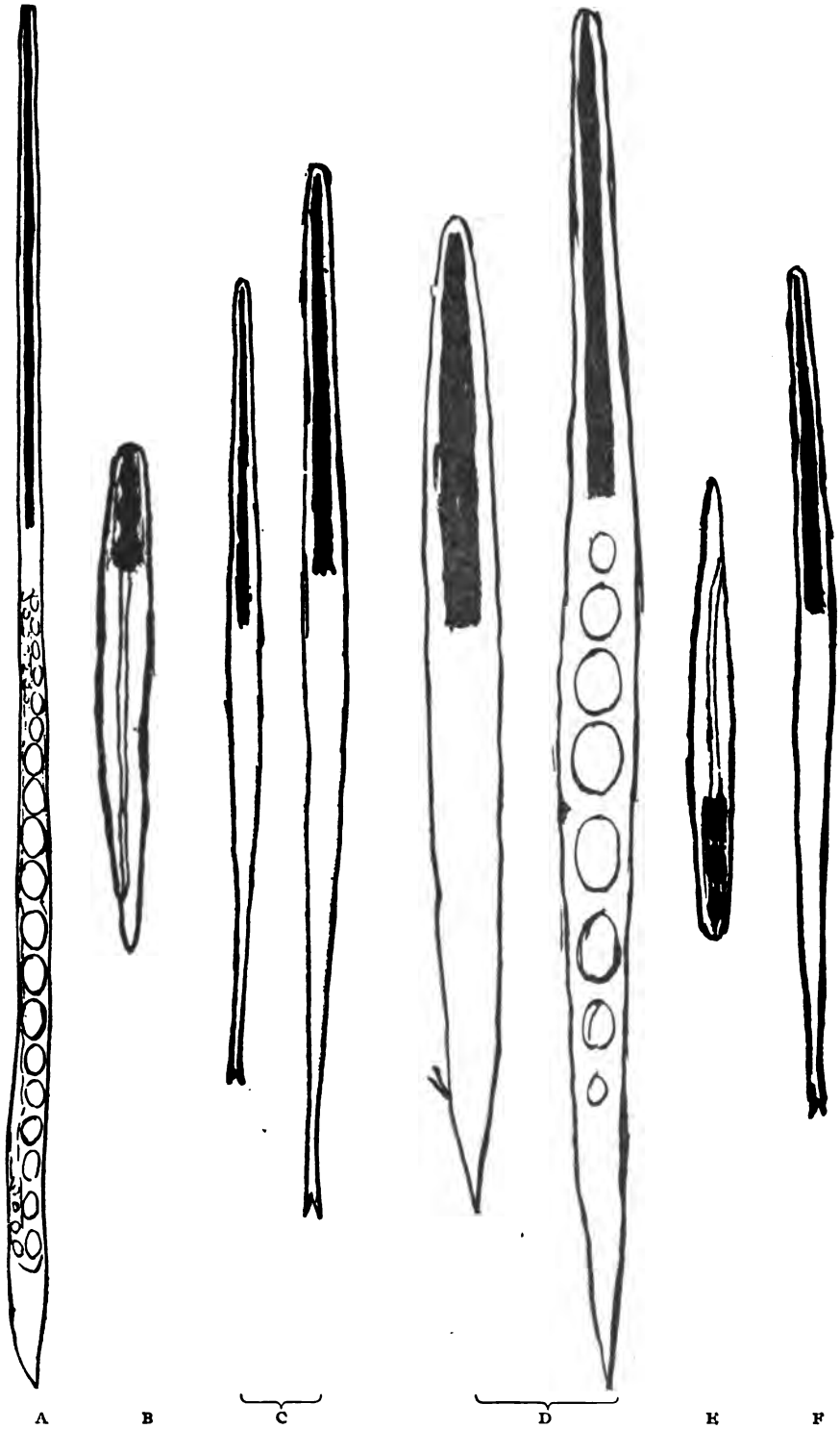

Diagram showing the relative sizes and the ratios of the esophagus to the total length of the parasite. A—Adult female parasite. B—Newly hatched rhabditiform larva. C—Filariaform larva. D—Sexual adults of nonparasitic generation. E—Freshly hatched rhabditiform larvae developing from D. F—Filariaform larvae of this generation. Note the amount of reduction of A.

of Uncinaria. The differentiation of these two species, on their morphology, is exceedingly difficult and depends principally on the shape of the mouth cavity. By incubation for from four to seven days the rhabditiform embryos of strongyloides may be changed into the filariaform embryo with its characteristic notched tail and then is easily recognized. Since the rhabditiform larvæ of Uncinaria probably never occurs in the stool until incubated for twenty-four hours, any embryo answering the above description as to size and form and occurring in the *fresh* stool, may with great confidence be considered those of strongyloides intestinalis.

This worm was first discovered in 1876 by Normand, a French naval surgeon, stationed at the receiving hospital at Toulon, where soldiers amounting to a considerable fraction of the army of occupation in Cochin China, were being invalided for an epidemic dysentery. The rhabditiform larvæ (b), and the adult forms (d), which developed from within four to five days, were described by his assistant Bavay. From the general resemblance of the larvæ to the ordinary vinegar eel (Anguillula aceti) the name Anguillula stercolalis, was applied to the new species. The following year the same observers discovered what was supposed to be another nematode, belonging to the same family, in the duodenum of a number of these cases coming to autopsy. These were termed Anguillula intestinalis. They were found most abundantly in the duodenum, less so in the jejunum, but never alive in the stools. Together with the rhabditiform larvæ they have subsequently also been found in the stomach contents, following the exhibition of apomorphine. Bavay also reported the finding of the filariaform larvæ with truncated tails (c), in old stools. These he believed to be the embryo of the second nematode.

In 1878 several contributions by French and Italian observers, confirmed these findings. Grassi noted that the embryos in the intestine, were all of Rhabditiform type, identical with those originally described by Bavay and that no filariaform embryo (a) appeared until after incubation for several days. Since no eggs appeared in the stool, Bavay's conception of the relation of the embroys to the adult, was highly improbable.

Considerable confusion prevailed in the literature of the next few years, both as to fact and as to nomenclature. No fewer than nine synonyms for this worm appeared in publications of this date, until that of Strongyloides intestinalis proposed by Grassi in 1879 has been generally adopted. Porroncito sadly confused this worm with Uncinaria and believed the eggs appeared in great numbers in the stools. Grassi proved conclusively that Porroncito had been dealing only with Uncinaria. Out of this controversy arose the true interpretation of the relationship of the various forms first suggested by Grassi, later conclusively proven by Luekhart, and summarized above.

In the same year, 1883, Grassi demonstrated that sexual reproduction was not essential to multiplication, since the filariaform embryo

(c), rising from the parthenogenetic female (a), may under certain circumstances develop, directly into another adult of the same type (a). Clinical proof of this fact occurs in the exacerbations in old standing cases, where reinfection could be rigidly excluded. Also, immature females, of the adult parasitic type, have been found at autopsy in cases of long duration, while the sexually perfect forms (d), have never yet been demonstrated in the intestine, unless conditions similar to artificial culture existed, that is, that the autopsy was unduly delayed.

In 1898 Leichtenstern concludes that "it is then a matter of purely facultative, by no means exclusive or obligatory heterogenecity". The factor governing the developement of the sexual perfect forms, under incubation of the stools, have never been made out. Certain strains of the organisms, particularly those found in subtropical countries, have refused all efforts to produce such development.

The length of life of the parthenogenetic female is quite unknown. Because of the possibility of autoinfection through the development of (a) from (c), it is impossible to make deductions from the period over which embryos may be found in the stools, when reinfection can be excluded, as has been done in the case of Uncinaria. Cases have been followed for many years without disappearance of the embryos.

Although the parasite has been observed in apparently healthy individuals, over long periods of time, the fact remains that certain cases suffer from a diarrhea, for which no other etiology can be found. On the other hand, the severe dysentery of Oriental tropics, in association to which the worm was first discovered, have been demonstrated to be due to other causes. In small numbers, they are very common all over the tropics and subtropics of both hemispheres, without any apparent effects upon the health of the host. General opinion, however, now considers them not quite the harmless parasites they were supposed to be in the last decade.

No treatment has ever been devised, which is sufficient against this parasite. The whole list of anthelmintics and intestinal antiseptics have been exhausted without improvement. It seems probable, however, that measures to promote the exit of the rhabditiform larvæ, before they have an opportunity to go through their complete metamorphosis into new parasitic females would be effective against constant reinfection.

In conclusion, I wish to repeat that the purpose of the discussion of this case here, is to call attention to the danger of confusion between the two very similar rhabditiform larvæ of Strongyloides and Uncinaria, a danger which is not sufficiently appreciated by physicians in temperate zones.

An extended bibliography will not be attempted. The curious are referred to the excellent article by Doctor Thayer in the *Journal of Experimental Medicine,* 1901, VI, 75, or to the monograph of Strong in the public health bulletins.

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A REVIEW OF THE OBSTETRIC WORK OF THE UNIVERSITY HOSPITAL MATERNITY FOR THE YEAR ENDING JULY 1, 1912.[1]

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[From the Clinic of Professor Reuben Peterson.]

DURING the last seven years the Obstetric Clinic of the University Hospital has shown a gradual increase in the number of patients admitted. The explanation of this growth is evident when one considers the untiring efforts of Professor Peterson to furnish adequate obstetric training for the junior and senior students of the University of Michigan. Of late another factor in this growth is evident, namely, the physicians of Michigan are referring, not only illegitimately pregnant women, but abnormal cases of pregnancy. Very wisely, these physicians believe that having diagnosed a dangerous and complicated case of pregnancy, the patient should have constant supervision, which can only be obtained in an institution or hospital.

The annual report of the University Hospital Maternity for the last year shows many interesting features, and it is the object of this review to briefly consider some of these.

REPORT OF THE UNIVERSITY HOSPITAL MATERNITY FOR THE YEAR ENDING JULY 1, 1912.

Number of cases registered	115
Number of cases admitted	109
Number of cases seen outside of Hospital	6
Number of cases confined	104
Number of primiparæ	75
Number of multiparæ	34
Number of maternal deaths	3
Number of premature births	9
Number of deaths of premature infants	4
Number of deaths of other infants	6
Number of still-births	5
Number of sets of twins	4

PATIENTS ADMITTED DURING THE VARIOUS MONTHS OF PREGNANCY.

Fourth month	4
Fifth month	3
Sixth month	14
Seventh month	21
Eighth month	26
Ninth month	41
Total	109

PRESENTATION AND POSITION OF THE FETUS.

Vertex Presentations		95
Occiput left anterior	51	
Occiput right anterior	32	
Occiput right posterior	8	
Occiput left posterior	4	
Face Presentation		1
Mento right posterior	1	
Breech Presentation		5
Sacrum left anterior	2	
Sacrum right anterior	2	
Sacrum left posterior	1	
Not determined		3
Total		104

TYPES OF PELVES.

Normal Pelvis	92
Abnormal Pelvis	12
Simple flat pelvis	2
Rhachitic flat pelvis	1
Generally contracted pelvis	1
Generally contracted funnel pelvis	1
Kyphotic pelvis	1
Simple funnel pelvis	6

ANTEPARTUM COMPLICATIONS.

Neuroses and Psychoses.	
Hysteria	6
Neurasthenia	2
Chorea	1
Manic-Depressive Insanity	1
Typhoid Psychosis (?)	1

VENEREAL DISEASES.

Gonorrhea	13
Syphilis	9
Eclampsia	1
Threatened eclampsia	2
Nephritic Toxemia	4
Cystitis	1
Septic knee following pneumonia	1
Septic sore throat and nephritis	1
Bronchitis	1
Condylomata	4
Marked secondary anemia	2
Marked caries of the teeth	1

Gastric ulcer	1
Acne vulgaris	1
Edema of legs and vulva due to pressure	1
Multiple sclerosis	1
Varicose veins of lower extremities	3
Cyst of Gærtner's duct—spontaneous rupture	1
Fibroids	2
Hydramnios	1
Ventral hernia	1
Premature separation of the placenta	1
Premature rupture of the membranes	5

INTRAPARTUM COMPLICATIONS.

Adherent placenta	1
Brow presentation, arm under chin	1
Concealed hemorrhage	1
Cord around neck of child	5
Delayed labor	3
Face presentation, impacted	1
Laceration of perineum	24
Precipitate labor	2
Prolapse of umbilical cord	1
Prolapse of an arm	1
Persistent occiput posterior	1
True knot in the cord	1
Uterine inertia	1

POSTPARTUM COMPLICATIONS.

Congested breasts	2
Gonorrheal sepsis	4
Postpartum hemorrhage	5
Retained membranes	3
Retroversion	1
Sapremia	6
Sepsis	2

OBSTETRIC OPERATIONS.

Abdominal Cesarean section	2
Porro Cesarean section	2
Vaginal Cesarean section	1
Pubiotomy	1
High forceps	1
Low forceps	4
Breech extraction	1
Manual extraction of the after-coming head	4
Internal podalic version	1
Manual removal of the placenta	2
Manual dilation of the cervix	3

Craniotomy upon a dead child	1
Amputation of a prolapsed arm of a dead child	1
Introduction of Champetier de Ribes's bag	1
Intrauterine douche	3
Primary repair of lacerations	22
Secondary repair of lacerations	2
Sterilization	1

OTHER OPERATIONS.

Repair of ventral hernia	1
Removal of condylomata	1

PATHOLOGICAL CONDITIONS FOUND IN THE INFANTS.

Congenital obstruction of the larynx	1
Congenital syphilis	6
Brachial palsy	1
"Blue baby"	2
Cephalhematoma	2
Eczema	1
Gangrene of skin over buttock	1
Erythema neonatorum (marked)	2
Icterus neonatorum (marked)	3
Harelip and cleft palate	1
Melena	1
Umbilical hernia	1
Conjunctivitis simple	6
Conjunctivitis staphylococcus	4

Smallest child (lived) two pounds fourteen ounces.

Largest child (carried ten months), eleven pounds two ounces.

Last year, an out-patient obstetric service was established. This was made possible by the local physicians, the local charitable societies and the visiting nurse, who referred deserving patients. During the first few months six women were confined in their homes and since then this service has grown rapidly. Each case is attended by a physician, a nurse, and a senior medical student. The benefit to the nurse in training and the senior student is great, as the whole confinement is conducted by them under the supervision of the physician.

A brief study of the maternal and infant mortality is interesting. There were three deaths among the mothers: the first was brought into the hospital in a moribund condition,—due to a severe eclamptic intoxication; the second death was due to pulmonary embolism following delivery of a patient suffering from multiple sclerosis and premature separation of the placenta. The third patient showed a complete placenta previa and had been packed to control the hemorrhage before entering the hospital. As it was very desirous that the child's life be saved in this case and in the face of probable sepsis, a Porro Cesarean

section was decided upon. The uterus was amputated and drainage left but the mother died of an acute and rapidly spreading peritonitis.

Four out of the nine premature infants died. The smallest premature infant raised weighed two pounds and fourteen ounces. This child was treated with normal blood serum for several weeks. There were six deaths among the full term children; three were due to syphilis, one had melena and two died of pneumonia. The causes of death among the stillborn infants were,prematurity, two; nephritic toxemia in the mother, one; eclampsia, one; true knot in the cord, one.

The results of pelvimetry in one hundred and four cases measured were most interesting. Twelve of this number were found to have pelvic deformities. One-half of these had simple funnel pelvis, the contraction being at the outlet. Five of the twelve cases required operative interference for delivery, two had the Cesarean operation and three had forceps deliveries.

Many important antepartum complications were observed but it would be impossible to review all of these cases. However, the large number of patients showing venereal diseases cannot be passed by. The majority of primiparæ cared for in the University Hospital Maternity are illegitimately pregnant, which probably explains the frequency of gonorrhea and syphilis. As a routine, the Wassermann test has been made on each patient. In this way, many who would otherwise have been overlooked, have been found syphilitic. Several patients were treated with salvarsan.

There were five cases of premature rupture of the amniotic sac. Whenever this accident occurred, the patients were prepared for delivery, sterile vulval pads were put on and the women were kept in bed. No vaginal examinations were made but the course of labor was followed by means of rectal examination. In no case did sepsis occur.

Two cases of sepsis developed in the puerperium, not considering the gonorrheal "flare-ups" in patients suffering from the Neisser infection. One case of sepsis was severe and followed an attempt at criminal abortion. The patient recovered after a posterior colpotomy. The second case was mild in character and soon cleared up.

The major obstetric operations for the year were numerous. The first abdominal Cesarean section was done for a contracted pelvis. Two years before, the patient had been pregnant. After a long labor, forceps were applied; the child was sacrificed and the patient sustained a complete laceration which was successfully repaired several months later. The mother and child were discharged at the end of two weeks. The second Cesarean section was done for a tuberculous kyphosis which made spontaneous birth impossible. The mother and child were saved.

The indications for the Porro Cesarean section were: first, terrific postpartum hemorrhage at two previous confinements due to fibroid uterus. The mother and child lived; second, central placenta previa. The mother died and the child lived.

A pubiotomy was performed upon a young primipara with an

impacted face presentation, the chin being posterior. Both mother and child made good recoveries.

Several of the most interesting obstetric cases of this year have been given in detail in the "Transactions of the Clinical Society of the University of Michigan" under the following titles:

Reuben Peterson:—"Present Status of Abdomnal Cesarean Section: When and How Should the Operation be Performed?" THE PHYSICIAN AND SURGEON, Volume XXXIV, Number X, page 407.

Reuben Peterson:—"A Report of a Case of Pubiotomy for Face Presentation." THE PHYSICIAN AND SURGEON, Volume XXXIII, Number XI, page 375.

George Kamperman:—"The Relation of Premature Rupture of the Amniotic Sac Due to Puerperal Sepsis." THE PHYSICIAN AND SURGEON, Volume XXXIII, Number X, page 326.

Howard H. Cummings:—"A Fatal Case of Eclampsia." THE PHYSICIAN AND SURGEON, Volume XXXIV, Number XI, page 85.

Howard H. Cummings:—"A Report of a Case of Twin Pregnancy with Severe Edema of the Vulva and Lower Extremities Due to Pressure." THE PHYSICIAN AND SURGEON, Volume XXXIII, Number XII, page 407.

Howard H. Cummings:—"External Pelvimetry with Special Reference to the Method of Measuring the Outlet." THE PHYSICIAN AND SURGEON, Volume XXXII, Number VIII, page 279.

Leslie H. S. DeWitt:—"Two Cases of Premature Separation of the Placenta." The PHYSICIAN AND SURGEON, Volume XXXIV, Number III, page 127.

STATIC DEFORMITIES OF THE LOWER EXTREMITIES.

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THE purpose of this paper is to call attention to a class of cases often diagnosed as rheumatism or neuritis, without taking into consideration the etiology.

The lower extremity is composed of four segments: The foot, the leg, the thigh, and the pelvis. This column composed of its four separate parts placed one above the other and bound together by ligaments and muscles is designed to support the superimposed body weight. It is therefore apparent that any deviation of one of these segments in its normal anatomic relation with the others must be followed by pathologic strain on some other part. The attempt on the part of nature to overcome this lack of balance produces a definite train of symptoms and often leads to bony outgrowths at the ankle, knee or hip-joints. To these indefinite processes has been given the name of static joint disease.

For example: A badly treated Pott's fracture nearly always causes a pes-plano-valgus and a corresponding shifting of the articular sur-

faces in the tarsal joints, twisting the bones in such a way as to cause a faulty contact of the cartilaginous surfaces and a loss of functions. A long continuation of this position will cause periarticular thickening at the point of strain, a decrease of the normal blood supply to the part and an atrophy of that part of the articular surface no longer in commission. Following this and at a somewhat later period, a calcification of the capsule will take place at the point of injury. Also osteophytis will appear as outgrowths on the bone, nature's method of reestablishing a balanced articulation.

Increased physical labor, sudden increase of body weight or debilitating sickness may be the prime etiologic factor. The first trouble may appear in the hip, knee, foot or sacroiliac joints and consists of a yielding of muscles, capsule or ligaments, thus throwing some one segment of the static column out of line and causing increased strain at the other points. Many cases of pes-plano-valgus show their first symptoms as an aching pain in the deep structures of the hip or at the sacroiliac articulation. For this reason all cases with indefinite pain located in the hip or over the sacrum should be examined carefully for any point of deviation, in the several segments of the supporting column. Thus oftentimes, lumbago-like pain of the hip or back disappears upon correction of a flat-foot. Treatment instituted at any stage of the trouble will often check further advance of the condition and prevent bony outgrowths at the point of strain.

Rachitic pelves produce a number of static deformities of the joints of the lower extremity. The much shortened anteroposterior diameter of this deformity and the increased intercristal diameter cause a forward and inward displacement of the acetabula. Thus, if the normal acetabular surfaces are in contact there must be a compensatory inward rotation of the whole lower extremity. In the act of walking the head of the bone is thrown partly out of the acetabulum in such a way that its articular cartilages do not coincide, bringing increased strain on the periarticular structures and causing outgrowths of bone, osteophytis and ossification of that part of the articular cartilage not in contact.

In bow-legs and knock-knees, which are usually associated with rickets, there is often an outgrowth of bone either on the condyle of the femur or the condyle of the tibia at the point of strain in an attempt to compensate for the deviation of thigh and leg from the normal weight bearing perpendicular.

REPORTS OF CASES.

A CASE OF PERNICIOUS MALARIA COMPLICATED WITH SUPPURATIVE PAROTITIS.

ALBION W. HEWLETT, M. D.
Department of Medicine.

This patient, the wife of a student, came to Ann Arbor from Mississippi on September 26, 1912. On October 6, she had a slight chill followed two days later by a more distinct chill. From that

time on to her entrance into the hospital she had an irregular fever which was suspected to be typhoid. On October 11, 1912 the blood count showed 4,000,000 reds, hemoglobin 80 per cent, and no increase in leukocytes. As the fever progressed the anemia developed with startling rapidity and on admission, October 19, the count showed 2,000,000 reds, 35 per cent hemoglobin and 4,000 leukocytes. She was pregnant, the last menstruation having been on June 26, 1912. On account of the rapidly developing anemia a ruptured extrauterine pregnancy was suspected but a pelvic examination showed a normal pregnancy. Aestivo-autumnal parasites in fair number were found in the circulating blood. A diagnosis of a severe malaria with rapidly progressing anemia was made. She was given ten grains of quinin hydrochloride intravenously on October 19, and fifteen grains intravenously on the following day. She was then given thirty grains a day in solution for six days and thereafter ten grains a day.

The effect of the quinin was not immediate. The temperature did not fall to normal for four days and during this time parasites could still be found in the blood though in decreasing numbers. The parasites in this patient therefore were unusually resistant to quinin. Her mental condition which was one of stupor on admission improved rapidly. The anemia, however, improved very slowly. On October 22 the count showed 1,500,000 reds and 28 per cent hemoglobin; on October 26, 1,400,000 reds and 27 per cent hemoglobin; on November 3, 2,000,000 reds and 33 per cent hemoglobin; on November 10, 2,700,000 reds and 53 per cent hemoglobin.

When she entered the hospital she had a tender swelling in the left parotid region. This swelling gradually increased. On the sixth day after admission she developed fever again, this time associated with a marked leukocytosis which reached 21,000 It was evident that she had a septic infection of the parotid gland. Fluctuation was detected and the abscess opened. From that time on she has shown a level temperature, and we believe that she will recover. At the same time as the parotitis, she developed boils on her arm and legs, which were also opened.

A CASE OF CHRONIC UREMIA WITH BILATERAL SWELLING OF THE SUBMAXILLARY GLANDS.

(Doctor Hewlett.)

This patient was originally entered in the Neural service on account of headache and his mental condition. He was transferred to the medical service on the thirteenth of October. His past history is unimportant. He has never been short of breath. His urinary symptoms developed about two months ago following a fall. His most marked symptom has been headache located especially in the occipital region. Some time ago he developed a rather sudden loss of vision and at the present time his eyesight is very poor. Examination of the retinæ shows a hemorrhagic retinitis with choroidal changes such as one might

get either in chronic nephritis or syphilis. He has lost about twenty pounds in weight. Mentally he has been confused and at times quite irrational.

The diagnosis of a chronic nephritis rests upon the large quantities of urine with low specific gravity, considerable albumin, and casts. In addition there is the hemorrhagic retinitis and the high blood pressure which has ranged from 170 to 250. It is interesting that the highest blood pressures coincided with the most marked uremic symptoms, a relation which is now well established The severe headaches were relieved almost immediately by lumbar puncture which showed the cerebrospinal fluid to be under considerable tension.

The diagnosis of such cases is sometimes difficult especially where the urinary changes are slight, such patients are sometimes believed to have brain tumor. The examination of the blood for substances which decompose the hypobromite of sodium is then of considerable value. As Widal has shown, the blood normally contains such substances in amounts which correspond to 0.3 to 0.5 grams of urea per liter. This patient showed on several examinations amounts corresponding to over 1.0 grams of urea per liter, a distinct and pathologic increase. The functional tests with phenylsulphonaphthalein also showed a reduction in elimination to about one-half the normal. All these tests were made by Doctor Agnew.

The swellings beneath the jaw appeared two days ago. They seem to be limited to the submaxillary glands and are associated with some local edema. The left submaxillary gland feels about the size of a large walnut, the right somewhat smaller. These swellings are only slightly painful. The lymphatic glands and the other salivary glands are not affected. The mouth is in bad condition and one might assume an infection from the mouth.

The swellings later disappeared without suppuration.

DISCUSSION.

Doctor Reuben Peterson: I might say a word regarding the diagnosis of the first case. I was called in to decide whether the patient might have an extrauterine pregnancy. There was no question regarding the presence of malaria, but the anemia seemed too marked unless there was present a very severe type of malaria. The pelvic examination showed a four months pregnant uterus with nothing outside of the organ. Since there was nothing to indicate intrauterine bleeding, it was possible to eliminate the pelvic organs as a cause of the intense anemia.

The internists were advised to administer quinin without reference to its possible effect on the pregnancy, since the malaria was the condition which needed treatment. Large doses of quinin were administered intravenously before the patient aborted. Even then the question arose whether the abortion was due to the quinin. I have always questioned the efficiency of quinin to start up labor pains. Just because

one gives quinin at full term and pains start up, does not necessarily mean that the quinin was the cause. And in many cases I have seen it administered with no effect.

After a few pains the os was dilated sufficiently to allow the escape of the fetus, but the placenta did not come away for some time. Doctor Seeley was about to pack the vagina when the placenta was discovered and removed. Packing to soften the cervix, start up labor pains, and prevent hemorrhage would have been indicated in the presence of marked anemia.

DEPRESSED FRACTURE OF THE SKULL, LEAKAGE OF CEREBROSPINAL FLUID AND CHRONIC EMPYEMA OF THE LEFT FRONTAL SINUS.

R. BISHOP CANFIELD, M. D.
Department of Otolaryngology.

Patient, Mr. B., aged thirty-five, mechanic. He was referred to the Otolaryngologic clinic from Surgery, where he was being treated for discharging sinus in the forehead near the median line. Nine years ago the patient was struck on the head while working in a lumber camp. The exact character of the accident was unknown. He remained unconscious for forty-seven days, during which unconsciousness he was trephined in the left frontal region and his left orbit was eviscerated. After a delayed convalescence he became apparently perfectly well and remained so until February 27, 1912, at which time he was struck on the head by an iron bolt. A few days later he had pain in the left frontal region and spontaneous rupture of the soft tissues with discharge of pus from a point just over the middle of the left eyebrow. At this time the skin was freely incised. The sinus resulting has discharged continually ever since.

Examination.—This shows the left eye missing; greater part of the orbital tissues absent; deep crater-like scar over the middle of the left frontal sinus, at which point the patient says he was trephined; and just median to this is a small granulating sinus from which pus escapes. The nose shows a low spur on the right side. Transillumination shows the left frontal and ethmoid dark. A radiograph discloses nothing in addition.

Operation.—October 10, 1912.—Ether anesthetic. Incision through the left eyebrow with vertical incision upward to neighborhood of hair line. Removal of the anterior table shows frontal sinus filled with pus and granulation tissue. Brain uncovered for a considerable area corresponding to part of posterior wall of frontal sinus. Depressed fracture the size of a thumb nail. Trephine opening over the frontal lobe lateral to and above frontal sinus showing considerable new bone formation. Curettage of frontal sinus, removal of the entire anterior wall, together with roof of orbit discloses necrotic bone below area of uncovered dura, removal of which uncovered large area of the left frontal lobe and part of the right frontal lobe. Old rupture of dura noted over half moon-shaped area ¼″ in diameter, situated just below and

in front of trephine opening. This rupture covered with very thin scar which was torn during the operation allowing the escape of a small quantity of cerebrospinal fluid. Wound irrigated and packed.

Following the operation patient continued to drain cerebrospinal fluid for ten days, after which time he made an uneventful recovery.

It is interesting to note that this patient must have been going about with his left frontal sinus filled with pus and granulation tissue and his dura covered with infected granulations for a long time without the exhibition of any symptoms which could attract his attention. We are accustomed to remark that the dura in the neighborhood of the temporal bone is very resistent to infection, but have also to consider that there is much greater likelihood of infection of the meninges when uncovered in the neighborhood of the nose or nasal accessory sinuses.

A CASE OF CEPHALHEMATOMA.

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Department of Obstetrics and Gynecology.

I wish to present for your consideration this evening a case of cephalhematoma in a child in the Maternity service of the University Hospital.

The family and personal history of the mother show no points of interest and the luetic history is negative. She was a primipara and the pregnancy in all respects uneventful. The position of the fetus in utero was diagnosed occiput right anterior. The mother was confined October 12, 1912, the labor being uneventful except for its short duration, which was only four hours and twenty minutes. The child was a large healthy female weighing 4,090 grams. The diagnosis of occiput right anterior was confirmed by the course of labor and the position of the caput which was on the posterior part of the left parietal bone.

Shortly after birth a purplish discoloration was noticed on the left side of the head extending to and including the left eyelid. A slight discoloration still remains but it has for the most part disappeared. On the third day after birth a tumor mass was observed for the first time on the left parietal bone. This increased until it became the size of a small lemon and has gradually disappeared until it has reached its present size. The tumor has been fluctuant at all times and has never shown any superficial discoloration. The Wassermann on the child was negative.

Cephalhematoma may occur in three locations: (1) Between the skull and the dura. (2) Between the occipitofrontalis aponeurosis and the periosteum. (3) Between the periosteum and skull.

The first is known as "internal," the last two as "external" cephalhematoma. The last variety is by far the most common. The location is most commonly the right parietal bone, although the left and at times both sides are also involved.

Etiology. — (1) Trauma — Forceps, precipitate or difficult labor. (2) Abnormal growth of hair on child's head. (3) Altered condition of blood. (4) Defects in bone due to defective ossification. Small fis-

sures are often seen at the posterosuperior angle of the parietal bones requiring very little pressure to extend them. (5) The cause cannot be found in many cases. It cannot be pressure or traumatism entirely as cases of cephalhematoma have been seen in breech presentations.

Diagnosis.—The diagnosis as a rule is not difficult in the external cephalhematomata; the points to be borne in mind being—(1) History of difficult labor or forceps or tendency to hemorrhage. (2) Occurrence of tumor mass one to two days *after* birth. Tense, nonsensitive. (3) A fluctuating mass, usually on the posterior part of the parietal bone, the edges of which gradually become hard, the remaining soft and often depressed. (4) The tumor does not cross a suture. (5) In some cases a crackling, crepitant sensation is expressed due perhaps to formation of minute bony plates on the inner surface of the periosteum (Holt.) (6) Gradual disappearance of swelling without treatment. The diagnosis of the internal variety is more difficult, and depends upon pressure symptoms, a history of traumatism that would lead one to expect internal hemorrhage.

Differential Diagnosis.—The condition is to be differentiated from the caput succedaneum, encephalocele, and hemangioma of the scalp.

Treatment.—The treatment is expectant; nothing is required to be done unless the hematoma becomes infected, when it is necessary to open and drain. The tumor disappears spontaneously in from four to six weeks.

DISCUSSION.

DOCTOR UDO J. WILE: It would be very interesting to ascertain the coagulation time of the blood in this patient. I recall a case of brother and sister, both of whom were subject to cutaneous hematomata upon the slightest trauma. One child had extensive hematoma of the scalp. It was found in both cases that the children were bleeders and their coagulation time was markedly slower than the normal. On examining the mother's blood and ascertaining her history it was found that she too had hemophilia.

DOCTOR LESLIE H. S. DEWITT: We have observed a marked icterus in the babies who have cephalhematomata about three or four days after the hematoma forms. This in all probability is caused by absorption from the blood clot. The icterus clears up within four to seven days and seems to have no ill effect upon the baby. This cephalhematoma is particularly interesting, because the labor was only five hours duration and spontaneous. Doctor Cowie thinks the hematoma may be a manifestation of some hemorrhagic disease of the new-born and he is doing some work with the blood of this baby to arrive at a diagnosis.

DOCTOR REUBEN PETERSON: Strange as it may seem, it is not always an easy matter to show the parents, relatives, and friends the advisability of letting the hematoma alone. The baby's head is somewhat deformed by the swelling, and they want the latter opened. This is the worst possible treatment since sepsis is liable to develop after the incision. If the hematoma is not opened, as a rule, it is slowly absorbed.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, DECEMBER 4, 1912.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR.
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

THE TRANSFUSION OF BLOOD.

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ANN ARBOR, MICHIGAN.
AND
OTIS MERRIAM COPE, A. B., M. D.
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THE operation of transfusion of blood has been performed by surgeons with various degrees of success for over five hundred years. It has always been supposed by the advocates of this operation that if one could transfer the blood of a healthy individual into the veins of one afflicted with disease or who had suffered from severe hemorrhages or shock from other causes, one might be able to restore to life even those in a dying condition. This operation was attempted as early as the time of Pliny and Ovid but it is only in the last few years that its technic has been so perfected that it can be done with success by any surgeon who understands the principles of vascular surgery by having applied them experimentally upon dogs.

It seems that the operation was known to the Egyptians and Herophilus refers to it in his treatise upon "Anatomy." It was condemned by Pliny and Celsus because up to their time the operation had always been fatal. It is also mentioned by Ovid in his "Metamorphoses."

The earliest authentic report of the operation is when it was done to prolong the life of an aged, dying Pope, Innocent VIII in 1492. The following quotation from Villari's "Life of Savonarola" is interesting.

"The vital powers of Innocent VIII rapidly gave way; he had for some time fallen into a kind of somnolency, which was sometimes so pronounced that the whole court believed him to be dead. All means to awaken the exhausted vitality had been resorted to in vain when a Jew doctor proposed to do so by the transfusion, by a new instrument, of the blood of a young person—an experiment which had hitherto only been made in animals. Accordingly the blood of the decrepit old pontiff was passed into the veins of a youth, whose blood was transferred into those of the old man. The experiment was tried three times, and at the cost of the lives of three boys, probably from air getting into their veins, but without any effect to save that of the pope."

Richard Lower in 1667 gave the first complete account of this operation and did the first experimental work upon it. He exposed the carotid artery of one dog and connected it by means of quills with the lower end of the jugular vein of another dog. In this case the donor was allowed to die.

Denys of Montpellier in the same year transfused from calves to dogs with success. He also performed the operation upon a man sixteen years old who had been exsanguinated as a result of being bled twenty times for fever. He withdrew three ounces of the man's blood and transfused nine ounces of arterial blood from a lamb with complete success at a time when antisepsis and asepsis were unknown. Progress along this line of surgery, however, was for some time successfully checked by a decree of the French Government in 1675 which forbade it unless such an operation was approved by the Faculty of Medicine of Paris.

In 1683 Kaufman and Purman cured a leper by transfusing blood from a lamb into his veins. In 1783 Michel Rosa, professor and president of the Faculty of Medicine of Modena proved by experimentation—(1) that one can inject more blood into the vessels of a normal living animal than they contain without overfilling them; (2) that one can transfuse the blood of one animal into another of a different species without endangering its life; (3) that the blood pressure can be restored in an animal which has been bled to the extreme limit by transfusing arterial blood from an animal of a different species. In 1792 Harwood performed a transfusion upon a dog before an audience. In the same year at Eye, in the county of Suffolk, Russell cured a case of hydrophobia in a young boy by transfusing blood from two lambs, after venesection. Blundell in England in 1818 withdrew eight ounces of blood from the femoral artery of a dog who soon had difficulty of breathing, convulsions, loss of sensibility and complete relaxation of the abdominal muscles. Within some seconds he took six ounces of blood from another dog and recovery was complete. Blundell, therefore, as a result of his good luck erroneously concluded that the use of the syringe did not affect the blood. He injected blood which he had allowed to escape from the femoral vein into a vessel directly into the femoral artery. He was able to do this for twenty-four minutes without the animal suffering any harm. As a result of injecting human blood into dogs after it had

remained in a vessel from thirty to sixty seconds he found that they all died either immediately or in several days. He found that the animals did not die unless the air was injected in too large an amount. He also discovered that it required a much less amount of blood to reanimate an exsanguinated dog than the amount of blood lost by the dog. He reported seven cases of transfusion of human blood, of which three ended in recovery, a very good percentage, indeed, when we consider the technic which was used, when nothing was done to prevent the coagulation of blood, the introduction of air and infection.

In 1825 Provost and Dumas showed that it might prove dangerous to mix the blood of one species of animals with that of another. About 1835 Bischoff concluded that defibrinated mammalian blood was not injurious to birds but would cause death if it were not defibrinated. He supposed that the fibrin contained a harmful substance which was the immediate cause of death. Panum and Browne-Sequard also regarded defibrination as necessary to the successful transfusion of blood in the human being. According to Blasius, during the forty years previous to 1863 there had been one hundred sixteen transfusions, fifty-six of which were with good results. These were all indirect transfusions, only two being from animals and the fourteen cases with undefibrinated human blood were unsuccessful. Air embolism was believed to be the cause of some of the fatal accidents. It was shown by Lowenthal in 1871 that small amounts of air in the circulation may be absorbed and no harm result.

In 1875 Guerin attempted an anastomosis between the arteries of two dogs so that their blood would circulate in common. The connection was made by means of a short rubber tube. The combined circulation would rarely be maintained more than half an hour. Of thirty-seven transfusions with defibrinated human blood during the Franco-Prussian War thirteen were successful. A little later Geselius and Haase transfused lamb's blood into human beings. Such operations were regularly accompanied by a febrile reaction and hemoglobinuria. Landis in 1875 showed that the red blood cells are destroyed and dissolved when transfusion is performed between two different species of animals. Panum, Landois, and others showed that transfusion from one animal into another of the same species may be successfully done without causing hemolysis. The latter reaction has never been noticed in dogs as the result of a transfusion. Crile has transfused from one dog to another with or without previous bleeding and later on has retransfused back again from the recipient to the donor without any ill effects upon either animal. Nor was there any ill effect after the introduction of the blood of a third animal.

The dangers of transfusing with defibrinated blood were observed by Magendie in 1838 who noticed that dyspnea, diarrhea and bloody exudates into the serous cavities followed it. A. Köhler in 1877 observed that the intravascular clotting after an intravenous injection of defibrinated blood was due to an excess of fibrin ferment. Von Bergman in 1883 came to the conclusion that the only reason there

had not been more fatalities after transfusion was that not enough fibrin ferment had been introduced to produce thrombosis. He considered the only proper method of transfusion to be from artery to vein but that even then coagulation was likely to occur in the canula. In spite of the many failures which followed this operation at this time, the enthusiasm over its possible good results led Emerson to refer to it as "the boldest promiser of all—the transfusion of the blood—which, in Paris, it was claimed, enables a man to change his blood as often as his linen."

In 1898 Crile began a series of experiments upon dogs by means of which he demonstrated the value of the operation and developed the technic. He has also applied the operation to the treatment of certain clinical conditions in the human being in about one hundred and fifty cases. At the Mount Sinai Hospital in New York about fifty transfusions had been done during the two years ending in 1911 and about one or two of these operations are done every week in the other hospitals of New York and in Boston, Philadelphia and Baltimore. At first the suture method of blood-vessel anastomosis which has been fully developed by Carrel was used and later special canulæ have been devised for this purpose.

The suture method of blood-vessel anastomosis is a difficult operation to perform and takes longer than any of the methods in which a special canula is used. Where the technic of Carrel is properly carried out the suture method is accompanied by very little intravascular clotting and makes a direct connection between the artery and vein without the interposition of any foreign body.

The operation is performed experimentally as follows: After the most careful aseptic precautions as regards the preparation of the field of operation, instruments, dressings, et cetera (because a slight infection may result in thrombosis) the common carotid artery of the donor is exposed and a ligature placed at its peripheral end. A pair of bulldog forceps, or a serrefine, the ends of which have been protected by cloth, are applied to the proximal portion of the artery which is then divided by a sharp pair of scissors close to the ligature. The adventitia must then be removed from the end of the vessel and the excess of it cut off. When it retracts it leaves the vessel clear. If any of this adventitia gets interposed between the edges of the vessels or around the sutures, it may lead to the deposit of fibrin and the formation of a thrombus. The vessel should be washed in Ringer's solution and vaselin applied or it may be bathed in paraffin oil to prevent clotting. A piece of rubber tissue should be placed in the bottom of the wound and the ends of the vessel laid over it. Next the external jugular vein of the recipient is exposed and prepared in the same way for the proposed anastomosis. A very fine silk thread may be used for suture material such as the so-called bead-silk. It should be separated into its constituent strands, three in each thread and each strand consisting of two smaller threads, so there are six single strands in a piece of this silk thread. A single strand or at least a double one may be used for

blood-vessel suturing. The strength of this suture material should be tested before using as one has to discard a good many strands before he can find one of the proper strength. A vascular suture, according to Guthrie, should be able to withstand the strain exerted by two ounces in weight when suspended in the air with this weight attached. Otherwise it will give way to the pressure of blood as it flows through the artery. Human hair makes the best suture for blood-vessels as it is easily threaded upon a small needle and will stand a greater strain than a single strand of silk. The sutures are threaded upon a number sixteen needle which is but slightly larger than a human hair. After the needles and sutures are sterilized they are placed in sterile paraffin oil and are then ready for use. The ends of the vessels must be free of blood before the anastomosis is begun. The needle carrying the suture is passed from without inward through the entire wall of the blood-vessel at its posterior portion and about one-half a millimeter from the cut surface. It is then made to penetrate the vein at a corresponding point from within outward, penetrating all of the coats. A temporary single knot is tied in the suture but it is not tied tight. This makes the first retaining stitch. The surgeon then places the second stitch about one-third of the circumference away from the first and a third stitch about the same distance away from the second. These three sutures are then tied tight and the intervening portions sutured with a continuous stitch. Great care must be exercised in tying the stitches as they are very easily broken. After the anastomosis is completed, the bulldog forceps are removed and the blood flows from the donor to the recipient. There may be some hemorrhage at the line of anastomosis but this will usually stop with a little pressure, or if necessary an extra stitch may be inserted.

Crile invented a canula provided with a handle which enables one to perform a transfusion within a few minutes. The vein is pulled through the lumen of the canula cuffed back over it and tied in place in the groove next to the handle of the instrument. The artery is then drawn over the vein and tied in the remaining groove of the instrument, thus bringing the intima of the two vessels into contact. Many successful transfusions have been performed by means of this instrument. It was thought at first that the intima of the two vessels must be brought into contact in order to prevent intravascular clotting. Later researches, however, have shown that by the use of smooth metallic instruments of silver or glass canulæ coated with paraffin or paraffin oil, a transfusion of blood can be successfully done without the danger of thrombosis. As a result of our experiments it must be said, however, that there is more danger of clotting following the interposition of glass or silver canulæ than with an instrument which makes close apposition of the intima of the two vessels, especially if the transfusion is continued for more than fifteen minutes.

The Elsberg canula is another instrument which is used for performing a transfusion of blood. The instrument is provided with a screw clamp which is applied to the artery to stop the flow of blood

while the anastomosis is being made. A ligature is then placed upon the distal end of the artery and three small tenacula are passed through the wall of the artery at equidistant points on its circumference and a few millimeters from the ligature. Traction is made upon these tenacula while the vessel is cut near the ligature. The artery is then cuffed back over the canula by means of the tenacula until it comes in contact with the four hooks on the instrument which are supposed to hold the cuff in place. After tying the peripheral end of the vein of the recipient, a small opening is cut into the vein and the canula with the cuffed artery inserted into it and a ligature tied around the vein and canula just behind the hooks. Elsberg, in a personal communication, says that "The best plan is to have the loop around the veins loosely before the canula is inserted into the vein and then to pull the loop back until it lies in the proper position and then to draw it taut. Only one loop must be made, for otherwise the canula cannot be opened." Upon unscrewing the canula the blood will flow across from the donor to the recipient. This canula is a very useful instrument because by means of the screw adjustment one can readily control the amount of blood flowing through it at any time.

Soresi has also invented a very useful instrument for the transfusion of blood which enables one to perform the operation in a very short time, about five minutes, and with very little danger of intravascular clotting. The instrument consists of two small metal cylinders which are put and held together by means of a small bar and a screw. Each cylinder opens on its longitudinal axis by a simple pivot and at one end a little below the edge is encircled by a crown of small hooks. One of the cylinders is placed around the artery and closed and the vessel is cuffed over the hooks of the cylinder; the same is done with the other cylinder in regard to the vein. The two vessels now are closely approximated and the vessels cut about two millimeters from the edge of the cylinders, their distal portions ligated and the blood is allowed to flow through the artery to be sure that it is flowing freely. Then the vessels are closely approximated and the screw tightened. This makes the anastomosis complete. Soresi has anastomosed the carotid artery and the internal jugular vein in dogs and has found the blood running without leakage after three days.

Several other metallic canulæ have been devised for the transfusion of blood but most of these depend on the same principle of bringing the intima of the two vessels into contact. Curtis and David make the transfusion from the vein of the donor to the vein of the recipient by means of an apparatus which enables them to measure the quantity of blood which is transfused but unless the apparatus is entirely coated with paraffin internally, clotting is sure to occur.

Another method for the transfusion of blood is by means of the glass canulæ of Brewer. These canulæ consist of "glass tubes, some straight with uniform caliber, others bayonet-shaped and others somewhat tapering in shape and caliber to be used when one wishes to transfuse from a large adult artery to the small vein of a child. Each

extremity of the tube is notched for the application of a ligature, after the tube is introduced into the lumen of a vessel." These tubes, after being boiled, are dropped into boiling paraffin and the excess of melted paraffin removed by shaking the tube in the air. This causes the paraffin to dry rapidly, leaving a thin film on both the inner and outer surfaces of the tube. The paraffin upon the outer surface may be removed in order that the canulæ may be handled more easily. Cope made some canulæ of glass patterned after the Brewer canulæ and we have used these instruments for several experimental transfusions. This makes the operation very simple but there is some danger of clotting especially if the transfusion is continued over fifteen minutes.

In order to demonstrate the value of transfusion of blood in clinical surgery we made a few experiments upon dogs. These animals were anesthetized either with ether or chloretone. A hemorrhage was then produced in the recipient and the depleted blood replaced by transfusion from the donor. A tracing of the blood pressure was taken by Cope upon the kymograph in several cases.

EXPERIMENT I.

Two medium-sized dogs were anesthetized with ether on December 21, 1911. A transfusion of blood was performed between the common carotid artery of the donor and the external jugular vein of the recipient by means of the Elsberg canula. The canula and the cuffed artery were inserted into the vein and a ligature was applied over it behind the hooks and then the blood passed over from the artery of the donor into the vein of the recipient immediately after unscrewing the clamp of the canula. A pulsation could be felt in the vein of the recipient corresponding to that in the artery of the donor. The transfusion was continued for about ten minutes. Then the vessels were ligated and the wounds closed.

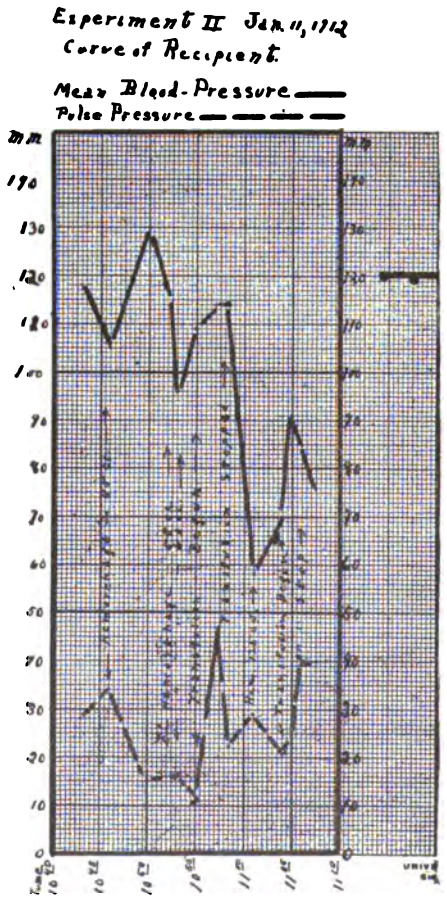
EXPERIMENT II.

A transfusion was performed by means of the Elsberg canula January 11, 1912. Ether anesthesia was used. The anastomosis was made between the common carotid artery of the donor and the external jugular vein of the recipient. An artificial hemorrhage was first produced from the femoral artery of the recipient and the record of the blood pressure of this dog was taken by Cope upon the kymograph by connecting the common carotid artery with this apparatus. The recipient weighed 19.5 pounds or 8.75 kilos and his condition was good. The changes in blood and pulse pressure as well as the other data of the experiment have been recorded in the following table. It will be noted from an examination of this table that the ether anesthesia undoubtedly raised the blood pressure at times. It will also be observed that the transfusion had been stopped at one time for about five minutes and then begun again without the formation of clots in the canula, because the blood pressure was maintained at nearly normal during the entire period of the experiment.

ELSBERG CANULA. RECORD OF RECIPIENT. ETHER ANESTHESIA.

RECIPIENT—8.75 KILOS.

TIME	Blood Pressure	Pulse Pressure	% Loss of Blood Weight	% Blood Pressure	% Pulse Pressure	DATA
P. M.						
10:43	118.00	28	....	.....	.....	
10:46	105.00	34	13.	—13.	—17.	Hem. started = 85 c.c.
.....	.....	..	....	.....	.....	Hem. stopped.
10:50	130.00	15	....	.....	.....	Ether (?)
10:53	116.00	16	8.4	—10.	16.	Hem. = 55 c.c.
10:54	96.	16	8.6	—15.	.....	Hem. = 60 c.c.
						Totals, 200 c.c.
10:56:40	109.00	12	....	+10.	—2.	Partial trans. started.
10:58:30	119.00	22	....	+ 7.7	+6.	Transfusion stopped.
11:01	58.	24	....	—46.	+1.	Hem. = 125 c.c.
11:04	69.5	16	....	+ 9.	—50.	Full trans. started.
11:07:40	76.0	40	....	+ 5.	+160.	Transfusion stopped.



By partial transfusion is meant that the canula was only partly opened and by full transfusion that the canula was fully opened by unscrewing the clamp to the full extent.

NOTES.

Results not reliable for the following reasons:

(1) No time record on tracing.

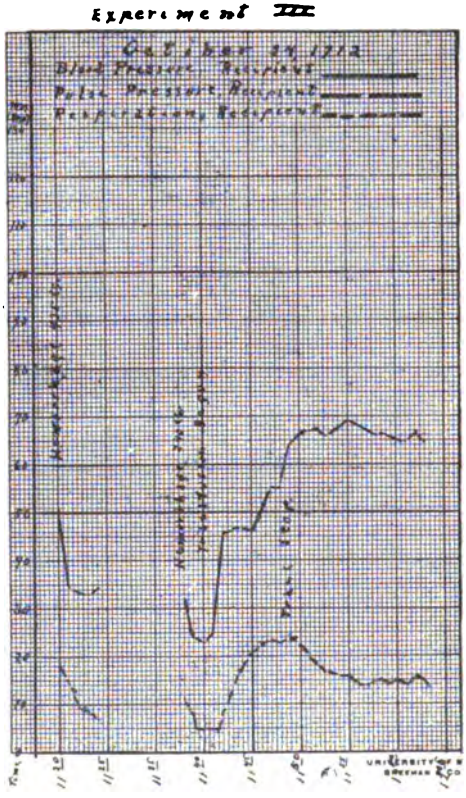
(2) Ether anesthesia causes variation in blood pressure, due to partial recovery from anesthesia during operation.

(3) Measurements not recorded by manometer on drum, but read directly from mercury manometer.

EXPERIMENT III.

October 24, 1912.—Donor, male; weight 18.51 kilos or 40.75 pounds; condition good. Recipient, female; weight 17 kilos or 37 pounds; condition good; 7.4 grams of chloretone given intraperitoneally to the donor at 5:00 P. M. and 6.8 grams given to the recipient at the same time. Dogs placed on the table at 9:25 P. M. Common carotid artery of donor anastomosed to external jugular vein of recipient by means of a glass canula made by Cope. Canula inserted into the femoral artery of the donor and connected with kymograph. Canula inserted into the carotid of recipient and connected with another kymograph. Canula inserted into the femoral artery of recipient for bleeding. Blood pressure of recipient was 38 millimeters of mercury at 11:00 P. M. when the operation was started. The dog shivered a good deal. The low blood pressure was probably due to the action of the chloretone. We started to bleed the recipient at 11:20 P. M. and withdrew 435 cubic centimeters of blood in two minutes' time and the blood pressure dropped to 34.5 millimeters of mercury. At 11:28 P. M. a glass canula taken out of paraffin oil was inserted into the carotid artery of the donor, the blood allowed to flow through and then the other end of the canula inserted into the jugular vein of the recipient. The transfusion was begun at 11:39 P. M. At 11:40 the blood pressure of the recipient was 24:19 millimeters and 240 cubic centimeters of blood were removed, the animal being bled until the blood just dropped from the canula in the femoral artery. Pressure upon the abdomen of donor at P. on curve raised his blood pressure about 5 millimeters. The transfusion was stopped at T. on curve at 11:49 P. M. and it had continued for ten minutes. During the transfusion the recipient stopped shivering but this phenomenon reappeared when the transfusion stopped. At 12:03 A. M. an attempt was made to start the transfusion again but no blood flowed across on account of the formation of a clot in the canula. This shows that it is dangerous to continue a transfusion after it has been interrupted because of the formation of thrombi in the veins of the recipient. The dogs were not allowed to recover from the anesthesia but were killed by the formation of pneumothorax.

Glass Canula.	Record of Recipient. Recipient 17 Kilos; Donor—18.51 Kilos.							Chloretone Anesthesia.
TIME	Blood Pressure	Pulse Pressure	% Blood Weight	% Blood Pressure	% Pulse Pressure	Total % Blood Pressure	Total % Pulse Pressure	DATA
P. M.								
11:20	50.6	17.9	34	....	....	....	....	Hem. = 435 c.c.
11:24	34.5	7.0	..	—32	—49	....	....	Hem. stopped.
11:38	33.0	10.8	19	— 2	+ 2	....	....	Hem. = 240 c.c. 19% blood.
11:40	22.0	5.0	..	—10	—32	—50	—70	
11:40:30	24.1	4.2	..	+ 2	— 4	....	....	Trans. started.
11:49	58.8	23.6	..	+62	+108	....	....	Trans. stopped.
A. M.								
12:00	60.0	15.8	..	+ 2	—69	....	....	



EXPERIMENT IV.

October 31, 1912.—Donor, male; light brown color; weight 17.4 kilos; condition good. Recipient, male; brown color; weight 8.5 kilos (?); condition poor; dog was anemic and under-nourished with apparently no panniculus, all the ribs could readily be seen and he was covered with fleas. Donor was given ½ grain of morphin and 1/75 grain of atropin and the recipient was given ¼ grain of morphin and 1/150 grain of atropin hypodermatically before the anesthetics were

begun. Ether anesthesia. The anterior portion of the neck in each case was shaved, scrubbed with soap and sterile water, then acetic acid and alcohol followed by sterile water and a bichloride solution 1-1000. The skin was then wiped dry with cotton and washed with benzine and painted with tincture of iodine. Under aseptic conditions the common carotid artery of the donor and the external jugular vein of the recipient were exposed. A pair of bulldog forceps whose ends were protected with cloth were applied to the proximal portion of the artery. A ligature was then applied to the distal end of the artery and the vessel cut close to the ligature. The proximal end was kept moist with paraffin oil to prevent clotting and the adventitia removed. A bulldog forceps was applied to the proximal and one to the distal portion of the vein, which was then divided near the distal end. The artery of the donor was then sutured to the proximal portion of the vein of the recipient by the method of Carrel, using human hair for the suture material. An artificial hemorrhage was then produced from the peripheral end of the vein of the recipient. The amount of this hemorrhage could not be estimated but it was continued as long as the blood would flow.

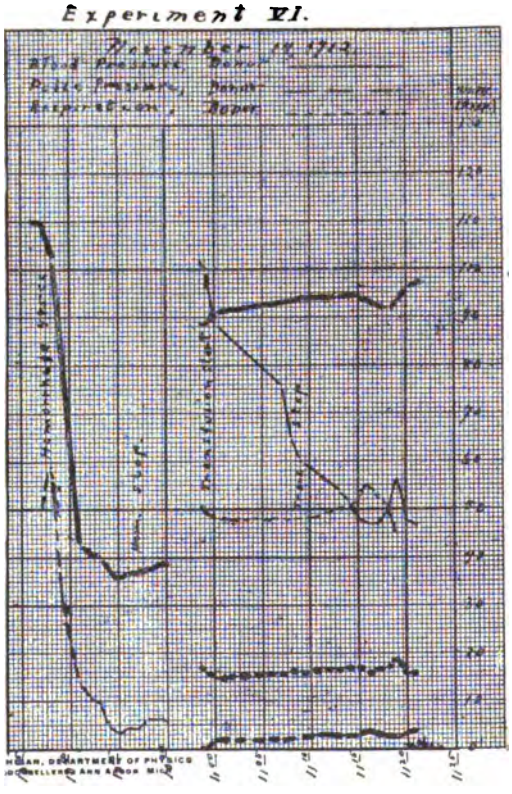
At this time, 10:38 P. M., the pulse of the recipient was 132 and the respirations 86. Five minutes later when the hemorrhage was stopped and the peripheral end of the vein ligated, the pulse was 102 and the respirations 80. At 11:00 P. M. the pulse was 100 and the respirations 70. At this time the transfusion was begun from the donor to the recipient. The vein of the recipient became distended at once and a pulsation could be felt in it corresponding to the pulse in the artery of the donor. After eleven minutes of transfusion the pulse pressure of the recipient showed noticeable improvement, and the respirations diminished in frequency to 54. After two minutes more of transfusion the recipient began to show signs of overtransfusion, the respirations being 40 and the pulse 140. The wounds were then sutured, tincture of iodine applied, and dressed with absorbent cotton and a many-tailed bandage. It was noticed at the end of the experiment that the pulse pressure of the donor was less than that of the recipient and his pulse was 140 and the respirations 36. The recipient began to have tremors in the hind legs while recovering from the anesthetic.

On the day following the operation the recipient was able to stand up and walk a little but seemed very drowsy and weak. The respirations were 35. About the third day he began to have a good appetite and to gain in strength. His weight increased from 7.5 kilos or 16.5 pounds before the operation to 10.1 kilos or 22.25 pounds four weeks after the operation. The transfusion has cured him of his condition of anemia and malnutrition.

EXPERIMENT V.

November 2, 1912.—Donor, white bulldog; female; weight 14.3 kilos; condition good. Recipient, white bulldog; female; weight 7.75 kilos; conditon good. Hypodermic of one-half grain of morphin and one-seventy-fifth grain of atropin given to donor and one-fourth grain

of morphin and one-hundred-fiftieth grain of atropin given to the recipient before the anesthetics with ether were begun. An artificial hemorrhage of three hundred cubic centimeters was produced from the peripheral end of the external jugular vein of the recipient. The blood was then transfused from the donor by joining his carotid artery with the proximal end of the external jugular vein of the recipient by means of a glass canula made by Cope. After being boiled the canula was placed in paraffin oil which had previously been sterilized and then used for the anastomosis. The artery was tied over one end of the canula, the blood allowed to flow through it and the vein tied over the other end. The blood flowed through the canula without clotting. The transfusion was continued for about ten minutes. The vessels were then ligated, the canula removed and the wounds closed. The technic was the same as in the previous experiment. Both dogs recovered and neither ever showed any signs of shock or of any complication.



EXPERIMENT VI.

November 14, 1912.—Donor, weight 17.3 kilos or 38 pounds; condition good. Recipient, weight 16 kilos or 35 pounds, condition good. Chloretone anesthesia. Canula inserted into the right femoral artery of the recipient for the purpose of recording the blood pressure. A

canula was also inserted into the right common carotid artery for the purpose of producing a hemorrhage. The hemorrhage was started at 10:07:21 and continued until 10:17 or for 2.87 minutes when the animal was in extremis: 485 cubic centimeters of blood had been removed. Record of donor taken from the femoral artery. This experiment shows that the transfusion cannot be stopped at any time without danger of clotting, but the rate of flow can be considerably reduced by compressing the artery without causing the formation of any clots.

RECORD OF RECIPIENT.

GLASS CANULA. CHLORETONE ANESTHESIA.

RECIPIENT—16. KILOS; DONOR—17.3 KILOS.

TIME	Blood Pressure	Pulse Pressure	Resp.	% Change Blood Pres.	% Change Pulse Pres.	% Change Kilo	% Change Blood Weight	DATA
P. M.								
10:07	110.50	49.00	18.75	.....	.....	.....	.....	Hem. started.
10:17	36.85	4.30	15.50	—33.	—91.	—17.	—40.	Hem. 485 c.c.
10:59	86.60	.56	17.25	+45.	— 7.	+ 9.	.....	Transfusion start.
11:09	94.17	2.45	16.00	+ 6.	+39.	+ 6.	.....	Trans. stopped.
11:19	93.42	2.03	19.00	— 0.6	— 0.8	+16.	.....	
11:56	98.66	5.47	18.25	—10.7	—88.7	— 3.9	(clot).	
				RECORD OF DONOR.				CHLORETONE-ETHER.
10:59	91.53	7.06	40.	.....	.....	.....	.....	Transfusion start.
11:09	59.04	1.92	48.	—35.	—72.	+20.	.....	Trans. stopped.

The clinging of the piston of the blood pressure recorder may account for some of the marked variations in pulse pressure.

Pulse pressure falls during hemorrhage.

Pulse pressure rises during transfusion.

Blood pressure falls during hemorrhage.

Blood pressure rises slightly after hemorrhage.

Blood pressure rises during transfusion.

EXPERIMENT VII.

December 7, 1912.—Donor, weight 22 kilos or 48.5 pounds; condition good. Recipient, weight 9 kilos or 20 pounds; condition good. Arrangements as in the previous experiments except that the Elsberg canula was used for the transfusion and that no hemorrhage was induced in the recipient. Chloretone anesthesia was used. The transfusion was started at 10:05 P. M. with the canula fully opened. The blood pressure of the recipient was 67 millimeters in the beginning and was increased to 141 millimeters at 10:17 P. M., or after twelve minutes of transfusion, and the donor died at 10:20 P. M. Postmortem examination of the donor showed all the peripheral vessels of the abdominal organs empty, there being only a little blood left in the larger trunks. At 10:55 P. M. the recipient's blood pressure had fallen to normal. This was undoubtedly due to a compensatory dilatation of the abdominal vessels to accommodate the increased amount of blood in the system. At 11:25 P. M. a second transfusion was performed upon the recipient from a second dog, anesthetized with ether, and the recipient's blood pressure was raised from 67 to 150 millimeters. It was also noticed that

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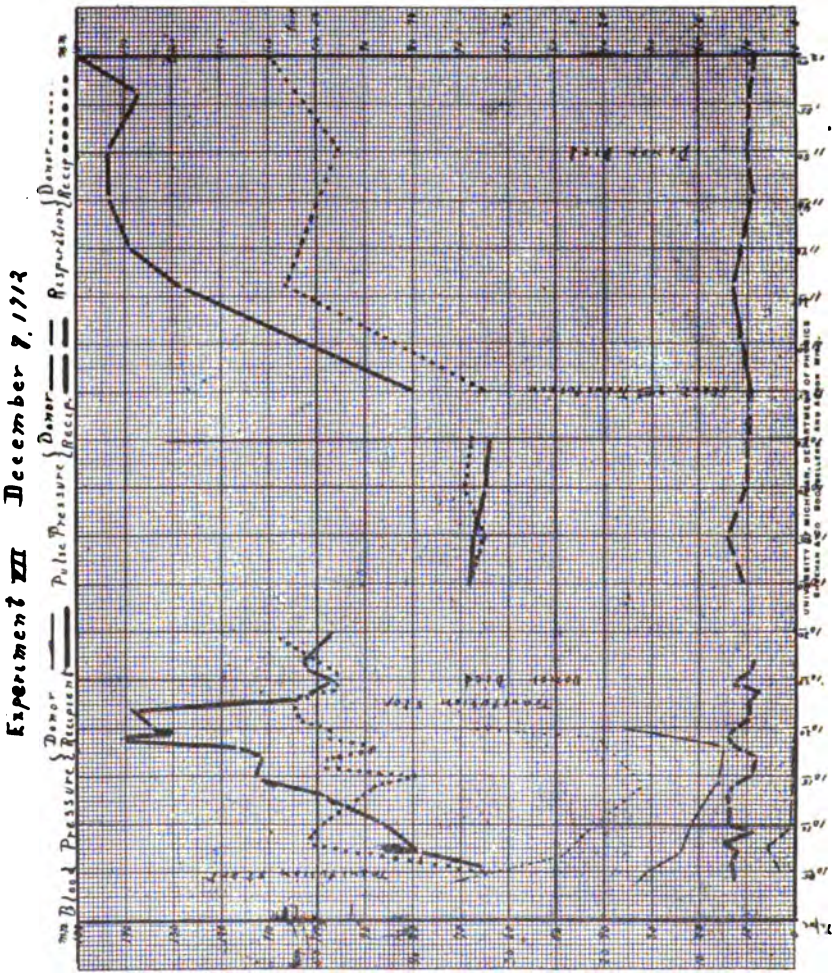
the recipient began to tremble markedly all over the body and that his skin was very red and the peripheral capillaries dilated. His respirations were above 50 during the period of transfusion. The abdomen was distended, there was edema all over the body and the mucous membranes of the mouth were dark red in color while those of the donor were pale. The donor died at 11:50 P. M.


Experiment III December 7, 1912
Blood Pressure Donor Recipient
Pulse Pressure Donor Recipient
Respiration Donor Recipient

We performed a double pneumothorax upon the recipient and found bloody fluid in both pleural cavities and marked edema of both lungs. There was bloody fluid in the pericardial cavity. We opened all the chambers of the heart and found them filled with blood. The heart continued to beat for ten minutes after all the cavities had been opened. Bloody fluid was also found in the abdominal cavity and all the vessels of the abdominal viscera were engorged with blood.

SUMMARY OF THE EXPERIMENT.

The blood pressure may be raised by overtransfusion to over twice the normal height with the result that acute dilatation of the heart will take place followed by acute edema of the lungs and the death of the animal.

From an analysis of the results of these experiments it is evident that the transfusion of blood is a life-saving remedy in the treatment of shock following severe hemorrhages.

Crile has shown by experimentation upon dogs that bleeding followed by transfusion of blood is of great benefit in the treatment of illuminating gas poisoning. He also found that it was always necessary to transfuse immediately after the heart had stopped beating, in order to save life. In similar cases the use of the ordinary methods of treatment such as bleeding, followed by intravenous saline infusion, artificial respiration and the inhalation of oxygen under pressure was ineffectual in saving life. McCombs, in an analysis of one thousand cases of illuminating gas poisoning, observed by him in several cities through his service upon the medical staff of several large gas companies of the United States, comes to the conclusion that if the "pulmotor," which is an instrument for maintaining a mixture of oxygen and air (sixty per cent oxygen) under a constant pressure of five atmospheres fails to resuscitate a case of this kind, then the transfusion of blood without previous bleeding is the best method of treatment. In this way we introduce fresh hemoglobin having oxygen in combination and which will not be displaced by the poisonous carbon monoxide already combined with the patient's hemoglobin. There is no doubt but that this method of treatment will save many lives which would be otherwise lost if treated by the ordinary methods in practice.

Crile has shown experimentally that transfusion is of great benefit in surgical shock by raising the blood pressure to normal or even above normal and maintaining it at that point for some time. It was found that normal saline solution was only of temporary benefit whereas the transfusion of blood was more lasting in its effects. Patients suffering from cachexia following carcinoma and unable to stand a radical operation for their disease have had their blood pressure raised by a transfusion of blood and then have successfully undergone the radical operation for their carcinoma later. It has proved of great benefit in the treatment of melena neonatorum and pellagra. It is of no benefit in pernicious anemia, leukemia, Hodgkin's disease, carcinoma and uremia.

When a transfusion of blood is to be done upon the human being, the anastomosis is usually made between the radial artery of the donor and the median basilic or cephalic vein of the recipient under local anesthesia. It has been supposed that the high blood pressure in the artery of the donor would force the blood rapidly into the recipient by overcoming the resistance offered by the peripheral system of veins. In reality, as Soresi has shown, on account of the resistance offered by

the venous system of the recipient and the smaller caliber of the vein the blood flows across quite slowly and thrombi quite often form. Even though the vein appears to pulsate synchronously with the artery, very little blood may be flowing across. In one of our experiments where a dog was bled through a canula in the common carotid artery the animal was in extremis at the end of 2.87 minutes. Soresi found in an experiment upon dogs where he anastomosed the external jugular vein of the donor to the corresponding vein of the recipient, both animals weighing about eleven kilos, that at the end of five minutes of transfusion the donor showed the effects of acute anemia and four minutes later was dying. The transfusion was then stopped and the donor died a few minutes later. It thus appears that in the case of a human transfusion if the blood should flow across at the normal rate it would cause the death of the donor if the transfusion were continued more than five minutes. Frequently transfusions have been continued from thirty to fifty minutes which shows that there must have been some obstruction to the flow of blood. This fact would also account for the failure of many transfusions because of the resulting thrombosis. Soresi also noticed the fact that when one blood-vessel is cuffed over a canula and the other pulled over it, there is a dead space between the intima of the two vessels where the blood may stagnate and coagulate, causing the formation of a thrombus which may occlude the anastomosis. By connecting a vein of the donor's arm with the external jugular vein of the recipient Soresi has shown that the blood flows more freely because of the negative pressure in the vein. By this method the blood flows directly into the heart aided by the suction of the heart during systole and by the changes in pressure in the chest during inspiration and expiration. An additional advantage of this method of operation is that it is not necessary to sacrifice an artery of the donor. The donor should be selected with reference to his ability to stand the loss of a large amount of blood and he should be free from arteriosclerosis and from any transmissible disease as syphilis and malaria.

If the blood is flowing across too rapidly its rate of flow should be controlled by pressure upon the artery with the finger or by some device on the instrument such as the screw of the Elsberg canula. The blood pressure and pulse of the donor should be watched throughout the period of the transfusion and the operation stopped whenever the donor shows signs of syncope. Lee reported to the New York Surgical Society, February 28, 1912, a case of collapse of a donor, twenty-six years old, whose blood was transfused into a man of fifty-five with secondary anemia from gastric hemorrhages. The transfusion was done by means of the Elsberg canula and the blood was allowed to flow for fifty minutes. His blood pressure fell from 160 to 140 during the first forty minutes and during the last ten minutes it fell to 100 and he collapsed with dilated pupils, cold perspiration and relaxed sphincter urinæ. His extremities were cold and the pulse was almost imperceptible.

tible. His condition soon improved after being inverted and freely stimulated and he recovered. In the case of overtransfusion the recipient will complain of pain in the region of the heart and dyspnea will develop. In such a case the transfusion should be stopped, the head raised provided there is not anemia of the brain, and massage of the heart used. In dilatation of the heart the area of cardiac dulness will be considerably increased toward the right and the pulse will be very rapid and irregular. In all cases the transfusion should be stopped when there is a sudden decided fall in the blood pressure of the donor.

Agglutination and hemolysis are complications which sometimes occur after the transfusion of blood. In most instances these reactions are not serious and the patients recover; but death has resulted in a few cases. Landois showed that the blood of one species of animal may exert a direct toxic action upon the blood of another species. Such a reaction can occur, however, after the mixture of similar bloods. Hemolysis usually results when one of the bloods is altered by disease while agglutination may even occur after the mixture of normal bloods. If a severe reaction of hemolysis occurs it may be followed by hemoglobinuria and death. It is believed in these cases that the membrane of the red blood corpuscles is destroyed by the action of certain protoplasmic poisons introduced from the donor's serum and hemolysis results because the osmotic pressure of the serum is a little less than that of the cellular contents.

The phenomena of isoagglutination of human blood cells were first pointed out by Landsteiner and Shattock in 1900. It is possible to classify human blood into four groups according to the way in which the corpuscles interagglutinate. Ottenberg and Kaliski report that they have seen two transfusions of blood, where agglutination took place and death followed in a few hours in each case. Ottenberg noticed this reaction also in a transfusion performed upon a young woman with a bleeding ulcer where the donor's serum agglutinated the patient's corpuscles but his cells were not agglutinated by the patient's serum. The amount of the patient's hemoglobin was increased from eighteen to forty per cent by the transfusion which was about equivalent to forty per cent as much as the patient's own blood volume. The patient recovered from the operation without any bad symptoms and it was discovered that all the agglutinin which had been transfused into her had disappeared. In a case described by Hopkins it was discovered that large numbers of the polymorphonuclear leukocytes contained red blood corpuscles. This patient died after the operation with incontinence of the feces, hemiplegia and coma. "The postmortem serum did not agglutinate the donor's corpuscles." "The agglutinins present when the serum was first examined were evidently bound." Hopkins believes that 'what was observed was probably phagocytosis of the transfused red cells by the phagocytes of the recipient.' Death in this case was attributed to intravascular agglutination. Ottenberg concludes from

the examination of four cases of transfusion in two of which the blood did not agglutinate and phagocytosis was not observed while in the other two the blood agglutinated and phagocytosis occurred that there is a close connection between agglutination and phagocytosis. It would seem that if the patient's condition will warrant it the time should be taken to make the tests for agglutination and hemolysis before a transfusion is done. As in most cases, however, where transfusion is required the patient's condition is so critical that the operation must be done at once in order to save life the surgeon is not warranted in postponing operation long enough to make the tests. Hitchings, who is an associate of Crile, says in a personal communication that "Crile has performed about one hundred and fifty transfusions and the hemolysis tests have been abandoned. This is partly on account of their not being absolutely reliable and also because usually when transfusion is indicated, the situation is such that the risk of having hemolysis occur in the patient must be accepted as a relatively negligible matter."

It thus appears that the operation of transfusion of blood is the only remedy which will save life in certain pathologic conditions where the patient is in extremis and with the proper selection of cases it should always be performed when it is definitely indicated.

GEORG: First National Bank Building.
COPE: 1327 Wilmot Street.

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DISCUSSION.

DOCTOR CHARLES B. G. DE NANCRÈDE: I have here a very valuable old book which was published in 1757, translated from the Latin, printed in 1712. At the time that I graduated from the medical school a large number of our theses, which were then necessary for graduation, were written in Latin. Here is a very good copper plate engraving of transfusion from the lower animals, and quite a long article on the subject of transfusion, not only transfusion, but intravenous medication. When I was a student and immediately afterwards we were experimenting with transfusion of blood, and other fluids, and it was quite a vogue for a while, about forty-five years ago.

A CASE OF METASTASIS IN THE FEMUR OF NORMAL FETAL THYROID TISSUE.

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MY chief object in presenting this communication is to call attention to a pathologic condition which, when viewed in the proper light, may perhaps lead occasionally to better practice. I shall briefly make a few preliminary remarks before reporting my case, premising all with a repudiation of any attempt at presenting an exhaustive study of the subject of thyroid metastases. I have been much impressed with the fact that in recent literature little or no attention has been drawn to cases similar to the one I shall report, and how little stress has been laid upon the entire question of metastasis in goitrous conditions, although the Germans have long called attention to the necessity of viewing with suspicion all osseous growths which occur in districts where goitre is common.

The attitude has apparently been assumed that metastases necessarily mean unquestioned "general malignancy," if I may use the term, and that by no possibility the metastases could consist of normal tissues constituting at most what could be called "local or clinical malignancy."

Among the hundreds of pages with which the profession has been recently flooded, devoted to the consideration of the embryology, anatomy, and pathology of the thyroid gland, and the treatment of the various forms of thyroid enlargement, few, if any surgeons have even hinted that other than frankly malignant neoplastic disease of the gland can give rise to metatases. This omission is directly in the teeth of repeated evidences that such occurrences have been noted and success-

fully dealt with by the surgeon. Possibly some of this blindness to fact is not alone due to insufficient acquaintance with surgical literature, but is attributable to the failure to subject every specimen removed either ante- or postmortem, to a rigid histologic examination, for no mere macroscopic appearances can serve to certainly distinguish an ordinary fetal thyroid metatasis from a sarcoma. When a superficial bone is the site of a metastasis attention is promptly called to the condition, but I can conceive that sometimes the correct clinical diagnosis of an infiltrating growth, leading perchance to fracture, is not always supplemented by a histologic diagnosis, hence is considered to be a primary sarcoma or a secondary carcinoma, when in reality it may be a metastasis of normal thyroid tissue.

It also seems not impossible—when secondary thyroid growths occupy other tissues than bone—that in some instances they entirely escape detection, or if removed, when the microscope is not used, their true nature may never be suspected. We are confronted with the question—What is malignancy? Does mere metastasis prove this, or does not malignancy also essentially consist in such an alteration of the normal development and function of the malignant tissue-cells that wherever located they possess the capacity for unchecked and riotous growth, penetrating and substituting all the tissues wherever located, so that portions readily escaping into the lymph or blood stream will lodge in distant parts, there to initiate the same course of events as were noted in the parent growth, especially the tendency to metastasis.

If the secondary growths neither differ histologically from normal tissue, nor tend to generalize, locally producing absorption of bone, and other tissues by their growth, and apparently not giving rise to metastases, such should not be considered to belong to the malignant class. The claim seems well substantiated that these benign metastatic tumors cannot be distinguished from normal fetal thyroid tissue. The transplantation of healthy thyroid in man and animals although not leading to permanent therapeutic results, certainly demonstrates that metastases do not occur, hence normal thyroid tissue is innocent, *per se*. Again, Kraske, and von Bruns, have successfully removed such metastases from the frontal bone, as has Riedel also from the lower jaw, while Jäger contends that primary adenomatous growths of the thyroid can and do lead to harmless metastases. The metastases usually tend to enlarge very slowly. Thus, two cases in Billroth's clinic attained the size of a fist respectively in six and eight years.

Bearing upon the nature of the primary thyroid growths, it must not be overlooked that certain malignant ones remain small and contracted, although enlarged lymph nodes are usually readily detected. The more central portions in such cases closely resemble dense fibrous tissue with here and there narrow crevice-like spaces containing degenerated cell remains, yet at the periphery the growth of both adenomatous and malignant tissue slowly progresses. Per contra, malignant disease of the thyroid usually presents the ordinary

symptoms of rapid growth, early extensive lymph-node enlargement, and involvement of the surrounding tissues, with pressure symptoms referable to the vessels and nerves from infiltration of the neoplasm.

Just before anesthesia was induced I noticed a very small thyroid enlargement which had escaped previous detection. Examination suggested nothing like malignancy, and the patient insisted that for several years past the goitre had steadily diminished in size, giving no trouble whatsoever. The history contains little of importance, but is subjoined.

* * *

HISTORY.—The patient entered the Surgical clinic December 8, 1907, because her thigh was broken last June, and is still ununited by bone. She was a female, married, and of German descent.

The present trouble began last February when she noticed a painful sensation in the left heel; the part began to swell. The pain and swelling gradually reached to the ankle, from here it passed to the knee or slightly above. Here a lump formed which she says was about the size of a biscuit. The lump remained and was painful when she walked. The 7th of last June she was taken with severe pains in the left leg, and fell on her side, twisting somewhat as she did so. She could not get up. The limb was fractured above the knee. The fracture was reduced, and the patient put to bed where she has remained until the present time.

On examination there is a marked deformity just above the knee-joint. The parts are swollen and painful to touch, and the skin is very tense. There is free mobility, and obscure crepitus. As the limb was only a painful encumberance it was removed January 6, 1908.

The patient was discharged cured, on March 24, 1908.

Pathologic-histologic diagnosis by Doctor Aldred Scott Warthin:—Metastasis of fetal thyroid tissue in bone, only locally malignant.

* * *

At the operation, an exploratory incision made to satisfy the medical attendants that the condition was such that nothing could be done to secure osseous union, revealed conditions which the reporter could not differentiate from those over and over again observed in bone sarcoma.

Still further, the statement that the goitre had been steadily growing smaller for some time past was an additional reason for failing to recognize the relation between the thyroid condition and the osseous disease. Had the thyroid enlargement been recently or throughout its course rapidly growing and infiltrating, the suggestion of an osseous metastasis of a malignant nature, would have forced us to make such a diagnosis, but the entire absence of any such conditions was very misleading.

This case is now put on record so that the possibility of this condition becoming more widely known, a much less formidable diagnosis than so-called spontaneous fracture due to sarcoma, or metastatic

carcinoma of bone, may be in some cases arrived at, a more favorable prognosis may be given, and benign thyroid metastasis may explain the condition. If the femur is concerned, a relatively low amputation may be tried, as in my case, instead of an hip-joint exarticulation.

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DISCUSSION.

DOCTOR CONRAD GEORG, JR.: Doctor de Nancrede mentioned in his paper that the normal thyroid gland has been transplanted experimentally into bone. This work has been done on dogs by Kocher. I tried this experiment about four years ago by transplanting a portion of the normal thyroid gland into the femur of the same dog. I found that these transplants tended to become absorbed and that the cavity made in the bone for the transplant became filled with new bone. Kocher succeeded in doing this by transplanting the gland into the part of the bone which joins the epiphysis. After preparing the opening in the bone he left in it a hollow silver ball for about a week or until a layer of granulations formed. The ball was then removed and the piece of thyroid implanted in its place, with the result that it grew there. The results in this case seem to controvert the opinion which has been expressed in the literature that the administration of thyroid extract was useful in helping bring about the union of an ununited fracture.

DOCTOR DE NANCRÈDE (closing): I wish the members of the society would mentally decide for themselves whether they think it likely that every case of metastasis is a sign of malignancy. There is a famous case on record in about 1856, where there were metastases from a primary enchondroma where nothing but mechanical effects result from the cartilage cells. There is a possibility that the thyroid gland in my case was somewhere carcinomatous. The whole subject of thyroid metastases is very interesting. There is a case on record where complete removal of the thyroid gland resulting in cachexia strumipriva was relieved when intrathoracic metastases developed. After the removal of the metastases the woman succumbed to the cachexia. The metastases were found to be carcinomatous. A secondary malignant thyroid metastasis sometimes then performs the functions of a normal thyroid gland.

A CASE OF NEOPLASM OF THE REMAINS OF THE WOLFFIAN BODY SIMULATING HYPERNEPHROMA.

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MRS. C., aged thirty-nine years, housewife entered the University Hospital, October 11, 1912, because of a mass in the left side of the abdomen and pain in the right side. There is nothing of interest in the family history, and up to the beginning of the present trouble the patient has always been well and strong.

In January, 1912, she had an attack of jaundice accompanied by nausea and vomiting but without pain or clay-colored stools. During

this attack which lasted about three weeks, she noticed that her perspiration colored her clothing and that her urine was very dark. She did not think that she had any fever during the attack, but she felt quite ill and was unable to be about some of the time. After the jaundice cleared up she felt in her usual health until August 1, 1912, when she first noticed that she could not lie on her left side and coincident with this she felt a hard mass in her left side just below the ribs. This mass was not at all tender but at times she experienced a sense of fulness and a dull ache in this region. Under treatment by her home physician she states that the mass gradually disappeared but the dull ache and discomfort continued although it gave her but little trouble. About the middle of August she was taken with a very severe sharp pain in her right side beneath the costal margin which radiated into the right side of the back and up the spine to the right shoulder. She also began to have some fever at this time and the pain and fever have continued up to the present. The pain was practically continuous, was made worse by lying on the left side, and had no relation whatever to meals. For the past two months her menstruation has been scanty. She has lost about twenty pounds in the past six months.

Patient is of medium height, weight one hundred nine pounds, musculature atrophic, panniculus scanty, slight icteric tint to the skin and sclera, conjunctivæ pale, lips slightly cyanotic. Clavicles are prominent, epigastric angle less than a right angle, signs of counter-irritation over the right costal margins, slight lagging over the right upper. Percussion note impaired, tactile fremitus slightly increased, spoken and whispered voice increased beneath the right clavicle. Liver dulness in third intercostal space, flatness at the fifth rib, mid-clavicular line. Traube's space is dull. There is dulness on the left side beneath the sixth intercostal space, nipple line, and this dulness is continuous with that of Traube's space and with the liver dulness. The breath sounds are bronchovesicular over the right upper, no râles over back, lung resonance to point between eighth and ninth spines on the right to tenth spine on the left. Except for somewhat increased rate and a slight systolic murmur over the pulmonary area, the heart is negative.

The abdomen is slightly above level of ribs and moves very little on respiration. A mass which descends slightly on inspiration can be seen bulging into the left flank from beneath the costal margin. This mass can be very readily felt. It extends about three finger-breadths below the costal margins, descends slightly on inspiration, is easily felt with the hand behind, and can be easily pushed forward and backward between the examining fingers. It does not have a sharp edge, is not tender, and feels firm but not very hard. Over this mass is a band of tympany which is increased on inflation of the stomach. On the right side there is a mass which extends almost to the umbilicus and slightly beyond the median line. This mass has a definite edge, descends

slightly on inspiration, can be felt with the hand behind but less distinctly than the mass on the left. Owing to the rigidity of the abdominal muscles and the tenderness over this mass it cannot be satisfactorily palpated but its outline seems to be that of an enlarged liver. Although the lower border of the two masses seems to merge at a point a little to the left of the median line it is found that the mass on the left can be moved independently.

Except for a slight secondary anemia and a leukocyte count of 17,800 the laboratory findings are negative.

Patient was cystoscoped and an attempt made to catheterize the ureters. The right ureter offered no obstruction to the catheter, but the catheter could be passed but a few centimeters on the left and there was no return of urine.

The abdomen was opened by Doctor de Nancrède on October 24 by an incision slightly to the right of the median line. The liver was found to be very much enlarged and contained numerous nodules of various sizes which were evidently malignant metastases. In the left upper abdomen beneath the spleen and above the kidney was a mass the size of a child's head, cystic to the feel, apparently arising from some retroperitoneal structure. In order to determine the nature of this tumor a trocar was thrust through its wall and a quantity of dark chocolate-colored fluid obtained. As it seemed quite hopeless to try to remove this tumor it was decided to evacuate the remainder of its contents through an incision in the back. This was accomplished and a quart or more of what appeared to be altered blood was removed. The cyst wall was then attached to the edge of the incision in the back and the abdominal wound closed.

Although the patient seemed to do well during, and for a number of hours following the operation, she showed signs of shock early the following morning and died in less than twenty-four hours after the operation.

To summarize: A woman of thirty-nine years previously healthy develops suddenly an intense jaundice unaccompanied by pain or fever, some nausea and vomiting. This jaundice clears up for three weeks, and she feels well for six months at the end of which time she discovers a mass in her left side below the costal margin and experiences difficulty in lying on her left side. Under treatment this mass disappears. A few weeks later she is taken with a very severe pain in her right side in the gall-bladder region. This pain radiates to the right side of the back and up the spine to the right shoulder. It is not affected by eating, is made worse by lying on her left side, varies in its intensity but never completely disappears. Loss of weight, twenty pounds in six months.

On examination we find a woman of medium build, sallow complexion, slightly jaundiced, somewhat emaciated. Except for high liver dulness the chest findings are not significant. In the abdomen are two distinct masses. The mass on the right is difficult to palpate but

feels like an enlarged liver whose lower border extends to the umbilicus and slightly to the left of the median line. It has a definite edge, descends slightly on inspiration and can be felt in the back. The mass on the left extends three finger-breadths below the costal margins, has no definite edge, can be moved independently of the mass on the right, descends slightly on inspiration, and can be felt very distinctly by the hand in the back. The slight secondary anemia and slightly increased leukocyte count are the only laboratory findings of possible significance. The ureteral catheter cannot be passed up the left ureter, and no urine can be obtained from that side.

In attempting to arrive at a working diagnosis in this case many possibilities had to be considered. The ultimate clinical diagnosis, that of hypernephroma with liver metastases, seemed best to account for all the conditions present, and also fitted in fairly well with the history this woman gave. However, in the hope that this diagnosis might not be correct and that the condition might possibly be due to some obscure inflammatory condition which could be relieved by surgical means, an exploratory operation was advised.

While it must be admitted that the condition found in this woman is not particularly common yet a rather hasty search through the literature has convinced the reporter that it is not sufficiently rare to be ignored by the clinician when considering obscure conditions in the upper abdomen.

MICROSCOPIC FINDINGS.

Mrs. C., aged thirty-nine years. Autopsy on October 26, 1912.

Heart: Atrophy, simple and brown. Slight fatty degeneration. Marked arteriosclerosis, fibroid patches in left ventricular wall. Changes about coronary vessels are very suggestive of an old congenital syphilis.

Lung: Chronic passive congestion. Emphysema. Numerous small hematogenous carcinoma metastases.

Spleen: Chronic passive congestion. Atrophy. Sclerosis of follicular arterioles. Increase of stroma. Hyaline areas in some of the follicles. Small nests of carcinoma cells found in several follicles.

Cyst near Kidney: Multilocular cystadenoma, with pseudomucin, precisely of the type of the ovarian cystadenoma, and represents a Wolffian body teratoid cyst. It has a capsule greatly thickened or hyaline connective tissue with areas of small cell infiltration and old blood pigment. In outer part of capsule are large nerve trunks and blood-vessels and lymph glands that show chronic inflammation and pressure atrophy. In one portion of the cyst the transition to adenocarcinoma can be clearly made out. The carcinomatous area shows a large amount of necrosis and mucoid degeneration, and in several parts in the cyst wall the connective tissue is infiltrated with carcinoma cells. The carcinoma is therefore primary in this cystadenoma arising in the remains of the Wolffian body or duct.

Liver: Largely replaced by metastatic medullary carcinoma, partly

adenocarcinoma in type. Cells showing a very marked mucoid and pseudomucinoid degeneration. Tumor in the liver is therefore secondary to carcinoma in the cyst.

Adrenal: Shows marked pressure atrophy near the cyst.

Pancreas: Tail of pancreas pressed upon by the cyst shows a chronic interstitial pancreatitis with atrophy.

Stomach: Slight catarrh.

Small and Large Intestines: Show slight catarrh. Localized thickening in the peritoneum.

Retroperitoneal and Hemolymph Nodes: Show carcinoma metastases with degeneration and large hemorrhages.

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REPORTS OF CASES.

CARCINOMA OF THE FACE TREATED BY THE ACTUAL CAUTERY.

CYRENUS G. DARLING, M. D.
Department of Surgery.

Mr. C., aged forty-eight years, entered the University Hospital in June, 1912, with an enlarged nearly circular growth, just anterior to and involving the upper portion of the lobe of the left ear. This was about three inches in diameter. He gave the following history:

About five years ago he noticed a small scab on the skin anterior to the upper part of the cartilaginous portion of the left ear. This scab was picked off from time to time, but always returned It continued to spread gradually until about the size of a silver quarter, at which time it involved the cartilage of the ear. One year after it was first noticed, he began treatment with the *x*-rays and it was treated with interruptions for a period of three years. Between these treatments he was treated with salves of unknown composition and also had a wet dressing applied. At the end of the third year he went to Saint Mary's Hospital in Rochester where the diseased portion was excised, cauterized and when granulations were formed, it was covered with skin-grafts taken from his right leg. There was relief for a time, but two small places never healed. In December, 1911, these spots were cauterized and again treated with salves and wet dressings until the time he entered the University Hospital.

After coming here he received *x*-ray treatments for two and one-half months, with little benefit, in fact the growth seemed to increase in size and was quite painful. October 17, 1912, patient was anesthetized and the whole area was treated with the actual cautery. The cautery was applied not only to the diseased portion, but the bordering skin was destroyed for at least a quarter of an inch outside of the affected area. The relief from pain was immediate and the slough took on the appearance of dry gangrene. There was very little discharge and the separation of the slough was effected in about twelve days, the wound being covered with healthy granulations. At the present time

repair is rapidly taking place at the upper and anterior border. Cicatrization has contracted the wound and the epithelium is covering the surface. At the lower part of the wound and near the centre there seems to be a return of the disease which is shown by the increased elevation and hardness of the parts, although the surface still maintains the appearance of fairly healthy granulations.

Some weeks ago a paper was read before this society concerning the treatment of cancer of the uterus by the actual cautery. It was shown that after the use of the cautery there was no more hemorrhage. The present case, I think, illustrates very clearly why those cases do not have a return of the hemorrhage. It would seem by the appearance of the return of the growth in this case that the connective tissue cells had by rapid proliferation produced a cicatricial barrier through which the atypical cells could not readily penetrate, and erosion will not take place until this wall has been destroyed by the overgrowth of the carcinomatous tissue. This part will be again cauterized and the result watched with a great deal of interest.

OSTEOMYELITIS.—(Doctor Darling.)

The serious results, which may follow in acute osteomyelitis will depend in a large measure upon the lateness of diagnosis and deferred treatment. This proposition is an old one, but results show that it will bear frequent repetition. The case which I am presenting is no exception to the rule, and the serious condition before us might have been lessened if the signs had been properly interpreted. This boy is fifteen years of age and never had any previous serious illness. His family history is good. His parents, brothers and sisters are all living and well. He has been so well that he was never attended by a physician until one was called for the present trouble. On the 19th of October, the boy got up in the morning with a very sore and inflamed left ankle. He was not able to go to school that day and the doctor was called. He (the doctor) said that the boy was suffering from rheumatism and advised hot applications which were applied to the affected part for three weeks, more or less, when the skin broke and there was a discharge of yellowish material, which was probably pus. The boy was very sick and so far as we are able to learn he had a high temperature. About ten days after the first discharge of pus, the patient was anesthetized and the wound freely opened, but he did not show much improvement. When he entered the hospital there was a discharging wound on the inner side of the left ankle. The foot was turned one-quarter way around to the outer side showing that the ankle attachment on the lower end of the tibia was entirely disorganized. The *x*-ray shows this disorganization some distance up the bone, but it does not show the change which has taken place in the medulla; the operation does that. Here is a piece of bone which was removed from the lower end of the tibia. It shows the lower end entirely disorganized and free from the epiphysis. This piece of bone was carefully removed so as not to disturb any of the epiphysis that might remain, because the

correct development of this bone will depend upon the presence of the epiphysis and the periosteum and that they still retain their power of regeneration. When the anterior half of the bone was cut away nearly to the upper end of the bone, it disclosed suppuration throughout the entire length of the medulla. The pus was wiped out with gauze and tincture of iodine was applied to the entire surface. The parts will soon be put in good position and held in place by a plaster-of-Paris dressing while nature completes the repair.

The early recognition of an acute inflammation, promptly incised and drained, will in many instances prevent the loss of tissue, such as I have described to you.

DISCUSSION.

DOCTOR CHARLES B. G. DE NANCRÈDE: I am glad to see that we are going back to a very ancient method of treatment when using the actual cautery. If in mouse cancer a moderate degree of heat will destroy its cause, this would be a great argument for the revival of this ancient and semimodern method of treatment. I think we must take into consideration the fact that whatever the causes of cancer are, we are no nearer a solution of the question now than many years ago. Whatever it is, it behaves very much like a microbic disease, and we do know that heat is a very efficient way of killing microbes which extends its effects far beyond the area where the heat is actually applied. If there is any truth in the treatment of cancer by heat, we get this most by the actual cautery. You can do wonders with other forms of cautery. You can get at least temporary cure for many years of carcinoma of the skin. You can get even final cures with mild potential caustics in skin carcinoma.

DOCTOR DARLING (closing): I simply wanted to show this case to illustrate the point that was brought out here by Dr. Percy, concerning the destruction of tissue by the cautery—why the hemorrhage does not return after using the cautery. If you will look at the central portion, you see the granulations there the same as on other parts of the surface, the other tissue cells being of rapid growth. In this way we will not get hemorrhage until erosion of this layer takes place. As soon as we get erosion of the tissue, there will probably be hemorrhage. All the surface from here up is healthy granulation tissue. We do not seem to have obtained a good result at the lower point.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, JANUARY 8, 1913.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR.
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

THE PRESENT STATUS OF THE RADICAL ABDOMINAL OPERATION FOR CANCER OF THE UTERUS.

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ON the whole it can be pretty definitely asserted that the radical abdominal operation for cancer of the uterus has never been and is not now commonly performed by American surgeons. Since it cannot be claimed that our operators are either less skillful or less intelligent than surgeons in other parts of the world, perforce there must be another explanation for the failure of the operation to become popular in this country. It will be the purpose of this paper to look at the question from a number of standpoints with a view of determining the reasons for the unpopularity of the operation, with a plea for a change of conditions so that the operation under consideration may be more universally employed. For, in spite of the discouragement which comes from not being able to make the primary and end results of the radical abdominal operation for cancer of the uterus all that could be desired, I am still a firm believer in the operation, which I perform whenever the opportunity arises, in preference to other methods of treatment.

The principal reason for the unpopularity in this country of the radical abdominal operation for uterine cancer is its high primary mortality. Surgeons are not accustomed in these days of highly perfected technic, to a primary mortality of from twenty to fifty per cent,

which would be a fair estimate of the mortality of the radical abdominal operation, if all reported and unreported cases could be collected. Surgeons necessarily must be content with such a high mortality in emergency operations, neglected cases where the knife holds out the only hope of saving life. Under such circumstances the surgeon consoles himself with the thought that without operation it is sure death for the patient within a few hours or days, and that every life saved is so much gain. However, it is different in the case of the woman with cancer of the uterus, who is able to walk to the operating room. Such a high primary mortality as has been mentioned in such cases dismays even the most unemotional surgeon, and makes his query if after all he is justified in continuing with an operation which carries with it such disastrous primary results. If to this doubt be added a secondary mortality by no means low from a recurrence of the cancer, it is not to be wondered at, if the surgeon abandons the operation upon what to him seems logical grounds and returns to the safer palliative procedure. I am firmly convinced that for the reasons set forth above, the personal equation has had much to do with the abandonment of the radical abdominal operation for uterine cancer by American operators. And until two things have been brought about, I believe the operation under discussion will not be generally adopted. First, the profession and laity must be so educated regarding uterine cancer that the disease will be recognized earlier and patients come to the surgeon when local and general conditions combine to bring about a low primary mortality. Second, for this particular operation true specialization must result, so that the occasional operator will be eliminated.

The profession has been singularly backward in inaugurating the campaign against carcinoma. It has held aloof for a number of reasons, prominent among which has been the uncertainty as to value of the knife as a means of cure. This doubt on the part of the great body of physicians has its origin in the poor surgical results obtained two or three decades ago from imperfect or incomplete operations, where the local disease was not entirely removed. A so-called recurrence after an amputation of a breast for cancer when the axillary glands were not removed, in reality is not a recurrence but a continuation of the disease. The same will apply to cancer wherever situated. But no matter how faulty the reasoning, once let an idea become firmly fixed in the mind of the medical body politic, there it sticks until dislodged by long and continuous efforts on the part of those who have had better opportunities for judging the true condition of affairs.

The pertinacity with which the profession clings to a totally wrong medical conception is illustrated by the erroneous ideas regarding fibroid tumors of the uterus even now existing to a certain extent. For years it was taught that it was best to tide the women with a fibroid tumor over the menopause, in the hope that all symptoms would cease after the cessation of menstruation. Time has shown this hope to be without foundation in the large majority of cases. Not only is it

true that usually the growth does not shrink nor other smyptoms such as increased flow cease, but the woman is exposed to other dangers even more serious, such as carcinoma of the body of the uterus. Yet so firmly was this idea of the beneficial action of the menopause upon uterine fibroid fixed in the minds of the profession and through them the public, that many a poor woman's life is jeopardized even at this late day through adherence to this faulty treatment.

Hence, first of all we ourselves must be convinced that cancer is a local disease and capable of cure if taken in time, and radically removed. Otherwise we can never hope to convince our patients and the public in general that there is any cure for cancer.

That surgical associations and others of a similar nature have not long ago united in a campaign against cancer can only be explained upon the basis of there being something which has prevented surgeons, as a body, from beginning the attack. What are the reasons which have held us back when we have seen the great benefits resulting from the antituberculosis campaign? It could not have been that we minimized the importance of cancer in its various forms, for we have known for some time that in certain communities the death rate from cancer exceeds that from tuberculosis. Nor could it have been because we have not had opportunities of seeing and studying the disease, for from the very nature of the case, the surgeon sees sooner or later the vast majority of patients suffering from cancer. Our hesitancy to inaugurate a cancer campaign is probably due to the fact that, unlike tuberculosis, the cause of cancer is still shrouded in mystery, and for that reason we are not in as good a position to enlighten the public as to how the disease is to be avoided. That this is true can be indirectly demonstrated by considering what would happen should the cause of cancer be discovered within the next month. Within six months there would be inaugurated a campaign against the disease fully equalling if not surpassing the crusade against tuberculosis. The medical and lay journals would be filled with matters pertaining to the subject, and people would be taught how to avoid this disease which for so many years, in the public mind, has meant sure death for its possessor.

As a profession we certainly have been remiss in not doing what we can to mitigate the ravages of cancer. While not abating a single effort to ascertain the cause of the disease, surely it is our duty individually and collectively to save by early diagnosis and by surgical means as many of the victims of cancer as we possibly can. Let the people be taught the early smyptoms of carcinoma of the uterus, and the results of the operative treatment would soon be improved. If cancer at first be a local disease, as most of us believe, there must be a time when even local without glandular removal will result in cure. The impossibility of determining from appearances or microscopic examination just how long the smallest cancerous lesion has existed, or just how far it was extended, will always stand in the way of our remain-

ing satisfied with anything short of radical removal of the disease. But the radical removal, because of the possibility of extension only discoverable through the aid of the microscope and removal when the gross appearances indicate that the cancerous process has attacked the surrounding tissues, are entirely different. Radical operation under the former conditions can be so perfectcd as to insure an exceedingly low primary mortality, and excellent permanent results; in the other class of cases the primary mortality must always be high and permanent results poor on account of recurrence.

Thus, the present status of the radical operation for cancer of the uterus at least in this country, is directly dependent upon early diagnosis of the disease under consideration. In my opinion, unless patients can be operated upon earlier, we have about reached the limit of what can be accomplished by the operation, except as the primary and end results may be improved somewhat, as the technical skill of individual operators be increased. This statement has reference to the percentage of absolute cures which is the reduction to one figure of the ratio between the number of cases of cancer of the uterus seen during a given period, and the number of patients operated upon by the radical abdominal method, who are alive and free from recurrence after five years. Winter has reduced this to a formula O X D/100, where O denotes the number of patients operated upon out of one hundred seeking relief and D denotes the number of patients remaining healthy out of one hundred operated upon.

If then in this country we have almost reached the limit of what can be accomplished by the radical abdominal operation for cancer of the uterus, or in fact by any operation with the cancer material as it is at the present time, the only way the percentage of absolute cures can be raised is by increasing the value of O or the number of patients with cancer of the uterus we are able to operate upon by the method under consideration.

Under the more enlightened conditions of cancer education prevailing abroad, it has been possible to obtain from twenty to thirty per cent of absolute cures of the total number of patients with cancer of the uterus seeking relief. Stated in another way, this would mean that one out of every four women with cancer of the cervix seeking relief can be subjected to the radical abdominal operation, and will be free from the disease at the expiration of five years. That surely is something to be striven for when one reflects upon the small number of patients he has been able to save out of the total number he has seen in a given number of years.

In another paper I have gone into the various aspects of the radical abdominal operation for cancer of the uterus. I have reported my results carefully, my successes and failures. Others have done the same, so that there is now an extensive literature upon the subject. To the unprejudiced mind it has been demonstrated that cancer of the cervix can be cured in a considerable percentage of cases provided the patients

are seen early enough and the operation is sufficiently extensive. But the fact remains that our results, both primary and permanent in this country are exceedingly poor, and that it is time we begun the campaign of education on carcinoma in general, and, because of its great frequency, cancer of the uterus in particular. While primarily this paper is a plea for the necessity of early recognition of cancer of the uterus, in order that the status of the radical operation may be improved, it seems to me it is the duty of this society to broaden the campaign so that it will include all kinds of carcinoma which can be benefited by surgery. In other words, I would have this society give its heartiest endorsement to the movement recently started by the Congress of Surgeons at its New York meeting to educate the profession and the public along cancer lines.

After the whole subject has been thoroughly gone into, and the plan of action determined upon it will be a very easy matter to interest the various state societies in the question. Just how the matter should be worked out is not particularly important here. The main things to be emphasized are: the poor results now obtained in the operative treatment of carcinoma; the possibility of improving the results of such treatment by earlier recognition of the disease by both the profession and the laity; the necessity of inaugurating a general campaign of education on carcinoma; and finally the desirability of having this society endorse this movement and coöperate in every way so as to bring about the results desired.

620 Forest Avenue.

DISCUSSION.

DOCTOR HOWARD H. CUMMINGS: It is a sad fact that the majority of patients suffering from cancer consult a physician only when the disease is far advanced. In the Gynecologic services we see possibly thirty or forty cases of carcinoma of the uterus during the year, and of these only four or five can be helped by radical operation. The home physician is not at fault, for these women do not consult him until a foul discharge or severe pains cause them to seek advice. Many women believe that it is perfectly normal to flow excessively at the menopause, and for this reason they will not consult a physician because of flowing. It seems to me that it is time for a campaign against cancer which should be carried on in a similar manner to that against tuberculosis.

DOCTOR JOHN A. WESSINGER: It has resolved itself into a campaign of cancer education, if we are to accomplish anything against this disease. It is a well-known fact that carcinoma is a much neglected condition, and as Doctor Cummings has well said, it is not the fault of the family physician, although it may be at times. However, women must be impressed with the fact that this condition is apt to arise during the child-bearing age. If this can be impressed upon them so that they will seek relief earlier the question will solve itself.

DOCTOR FREDERIC M. LOOMIS: Without authority from Doctor

Peterson, and necessarily in an inefficient way, as an intern in the Gynecologic department, I have attempted to do something along the line Doctor Peterson has spoken of. Most of the patients when they leave the hospital are feeling very well, in fact, better than they have for a long time, and are in a most receptive frame of mind. I have attempted to teach these intelligent patients—and some of them are very intelligent women—something of their proper relation to the doctor, their proper relation to the hospital, and their proper relation to themselves, and with this I have attempted to impress upon many of them the early symptons of cancer of the uterus, and the fact that pain is the last sympton.

Many of these women belong to organizations, such as the Eastern Star, Daughters of Rebecca, or other societies, and as their hospital experiences naturally form the chief topic of conversation for some time, I have hoped that such instruction as they have received might eventually be spread among their associates and thus prepare the way for more efficient and thorough teaching later—or even possibly be the indirect means of saving life by prompting earlier consultation of their home physician.

Doctor James F. Breakey: The general subject of cancer has, of course, received a great deal more attention in recent years. Late carcinomatous conditions are discovered more frequently in women, cancer of the breast and cancer of the uterus particularly, due to the fact that the education of the public has been neglected. I doubt whether late cancers are found in other parts of the body as frequently as they are in the breast and uterus. Women have objected to examination from time immemorial, and will continue to do so until they can be taught that any symptons should be investigated. I think much is being done by a rather general education toward bringing women to look upon themselves as human beings, demanding and deserving proper medical and surgical care regardless of the seat of their troubles. All efforts looking to the early education of the public should be encouraged. False modesty and prudery should be discouraged, and women taught that proper examinations of breast or pelvic organs are as necessary and should be as routine a matter as examination of any other part of the body. When this is accomplished, late cancer of the uterus will be no more frequent than late cancer elsewhere.

Doctor Cyrenus G. Darling: There is one point in Doctor Peterson's paper to which I would take exception. It does matter where the campaign begins. It makes a great difference where people get their information. The place to begin is at the University of Michigan. What is the use of having a university or a medical department if they are not to be of some use to the state.

This is the opportune time for the establishment of a department for the study and treatment of cancer. All cases of cancer should enter this department and from this be referred to the various surgical departments for treatment and operation when advisable. I think

that this method would furnish Doctor Peterson with as many cases as he could desire for operation. This department should be in touch with all physicians throughout the state and should urge them to send their cases early for diagnosis.

DOCTOR PETERSON (closing): I think Doctor Darling is right and that we could accomplish a great deal by starting the cancer propaganda from this University. It would be very desirable if a cancer hospital could be erected here. Naturally to accomplish anything it would have to be liberally endowed, yet that is not an insurmountable obstacle to its erection, since there are no particular reasons why state institutions should not be well remembered by philanthropists looking for places where their money will do the most good. An endowed cancer research hospital would do a great deal of good not only in the way of work to ascertain the cause of cancer, but also by helping unfortunate cancer patients of whom there are a large number in Michigan. At times in our one clinic alone there are as many as eight patients with cancer of the uterus, most of them too far advanced for more than palliative treatment. Let these patients and others once get it out of their heads that cancer is necessarily a fatal disease, and many more would apply for treatment before it is too late. The need of a cancer propaganda is at once apparent when we consider that nearly as many people in Michigan die of cancer as of tuberculosis. Whether a campaign of education on matters relating to cancer should be begun by publications in popular magazines like the *Ladies' Home Journal* or the *Saturday Evening Post*, or whether the national surgical societies should begin with the physicians themselves, is a matter of opinion. I am inclined to think both plans should be tried with the idea of acquainting as many people as possible with the true status of the cancer problem.

A CASE OF ABDOMINAL CESAREAN SECTION IN AN IMBECILE DWARF.

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Miss A. Y. entered the University Maternity Hospital on June 22, 1912. The patient is a primipara, seventeen years of age, single, and an American. Her parents are living and in good health. The mother is an imbecile. The father is of average mentality. The four sons in the family show no mental impairment, but the patient and a younger sister are half-wits.

The patient had never been ill. Puberty was established at the age of fifteen. Her periods came regularly each month, and the flow, which is moderate in amount, continues over one week. She has no pain. The date of her last menstruation is not known. The patient's general health is excellent.

The probable date of confinement cannot be estimated because the

beginning of amenorrhea is not known. The history of the present pregnancy is entirely negative. She has had no symptoms indicative of a toxemia.

The father of the child is an alcoholic, forty years of age, and not bright.

Physical examination shows her weight to be eighty-nine pounds, height four feet and eight inches. Examination of her heart and lungs is negative. The breasts show the usual changes of pregnancy to a marked degree. The abdomen is distended from the pubes to the ensiform. The fetus is in the occiput right anterior position, fetal heart rate 140 to 150 per minute.

Mensuration of the pelvis shows the following measurements:

Inlet.	Centimeters	Outlet.	Centimeters
Interspinous	24.5	Bisischial	7.5
Intercristal	25	Anterior sagittal	5.5
Bitrochanteric	27.5	Posterior sagittal	8
External Conjugate	16	Anteroposterior	10
		Diagonal conjugate	10
Pubic arch measures about 75°		Conjugate vera	8

The above measurements reveal a marked contraction of the anteroposterior diameters causing a flattening of the pelvis. The diameters of the outlet are also contracted making the shape of the pelvis like a funnel.

On vaginal examination the whole sacrum is easily palpable, the promontory is present. The bone is laterally convex instead of concave. The changes in the sacrum are typical of rhachitis. The interspinous and intercristal diameters are of about the same measurements and the much shortened bitrochanteric are also rhachitic in origin, therefore a diagnosis of an absolutely contracted rhachitic pelvis of the flat-funnel variety can be made.

The laboratory findings are as follows:

Blood examination 4,200,000 red cells, 10,500 white cells and 80 per cent hemoglobin. The Wassermann test is negative. Urine examinations have been repeatedly negative. Blood pressure is 100 to 115 millimeters.

The history of this patient was presented recently at a medical society meeting and much diversity of opinion existed as to the proper method of treatment. Some said that a child from such parentage should not be allowed to be born alive, and they thought a craniotomy should be performed. The patient is a member of the Catholic Church, and that church forbids ever sacrificing the life of a fetus. It was suggested that the fetus be baptised in utero and then the craniotomy done.

Others were just as enthusiastic to save the life of the child. Induc-

tion of labor at the eighth month was suggested in the hope that the child could pass through the pelvis because of its smaller size. Others thought a test of labor should be allowed, to be terminated by forceps and if that were impossible to perform a craniotomy as a last resort. Some were of the opinion that abdominal Cesarean section was the only logical operation.

The consensus of opinion was that the doctor had no right to cause the death of the child and that the life of this child was just as much a part of the problem as the life of the mother.

Abdominal Cesarean section having been decided upon, written permission was obtained from the father to do anv operation which was thought advisable.

On November 23, 1912, an abdominal Cesarean section was performed. The abdomen was prepared the day before the operation by shaving, scrubbing with soap and water, flushing with 1 to 1,000 bichlorid and applying a dry sterile dressing. The patient received one ounce of castor oil. A simple enema was given the morning of operation. Before being taken into the operating room the abdominal dressing was removed and the abdomen swabbed with the full strength tincture of iodin. The bladder was emptied by catheter.

After everything was in readiness for the operation the patient was brought into the operating room. The anesthesia (ether) was started and under primary anesthesia the abdomen was opened by a six-inch incision three inches above and three inches below the umbilicus and to the left of it. The uterus was incised for about four inches without delivering it outside the abdomen. The placenta, which was attached to the anterior wall, was cut through. The child was then grasped and delivered. The baby cried immediately. The placenta and membranes were then peeled from the uterine wall. The uterine incision was closed by three layers of sutures, plain Van Horn catgut being used. The peritoneal coat of the uterus was sutured with black silk.

Before closing the abdomen the patient was sterilized by ligating and severing both tubes and burying the cut ends beneath the peritoneum.

The abdomen was closed by through-and-through silkwormgut sutures, iodin catgut for the peritoneum, muscle and fascia, and metal clamps for the skin.

The patient left the operating room with a pulse of 90, and a firmly contracted uterus.

The child was a healthy appearing female weighing six pounds.

The patient developed a suppurative cervical gland during the first week due to an alveolar abscess which had been opened four months previously. During the third week she developed a right-sided pleurisy which disappeared within a week.

The abdominal wound healed by primary union and the uterus involuted normally.

DISCUSSION.

DOCTOR REUBEN PETERSON: The patient is doing very well and so is the baby. What the future holds out for this child is hard to say, but certainly, as far as obstetrics is concerned, the child has to be saved as well as the mother.

With both inlet and outlet contracted, as shown by the figures before you, Cesarean section was indicated, even with a first pregnancy. If, after a long test of labor the head had passed the superior strait, the contraction of the outlet would have been enough to have resulted in the death of the child and perhaps serious injury to the mother. We are greatly indebted to Williams for his illuminating articles on contraction of the outlet. It explains many cases of dystocia in the past, where the difficult delivery was attributed to other causes. Perhaps I can best illustrate this by citing a case recently treated in my private hospital. The patient, a young married woman of twenty-four, had been warned against pregnancy by a physician on the ground that she had a contracted pelvis. On the advice of another physician who did not examine her, she became pregnant. After a long, ineffectual labor, three doctors finally succeeded in delivering her after crushing the child's head. She was brought to the hospital three weeks after delivery because of incontinence of urine and feces. Examination showed a narrow pubic arch with great contraction of the outlet. The only possible way in which the head could be born was for it to descend toward the coccyx and this meant a complete tear up into the rectum when the head was born by extension. Luckily there was paresis of the bladder and not a vesicovaginal fistula, for so rigid was the vagina from scar tissue and so contracted was the outlet, that it would have been impossible to repair such a fistula from below. A plastic operation restored the torn sphincter ani. In case of another pregnancy she is planning to have a Cesarean section.

You may ask what about the baby. Where can it be placed since naturally no one would wish to adopt a child with such heredity. Luckily in this case the mother is a Catholic, and the church will care for it. But other defectives are not so fortunate. There are two feeble-minded pregnant girls in the clinic at the present time, one of whom is pregnant by her own brother. There is need of still another institution here, where defective children can be cared for, not only defectives but diseased children, for at present the state's only provision for such unfortunates is what is offered by the county houses.

Although I do not usually sterilize the patient at the first Cesarean section, this seemed to be a case where it was indicated. The father not only gave his consent to the operation in writing, but begged that the girl be sterilized in order that the unfortunate patient should not again become pregnant.

I wish to emphasize the importance of the minimum amount of ether for a Cesarean section. That is why the patient was prepared for

the operation before the anesthetic was started. It does away with the rapid pulse so frequently seen at the close of a Cesarean section, and it is much better for the child which is often difficult to resuscitate because of the anesthetic, if the mother is deeply narcotized.

CASE OF MIXED BILATERAL SARCOMA AND CARCINOMA OF THE OVARY, WITH AUTOPSY.

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Mrs. S., age forty-three years, entered the Gynecological clinic November 9, 1912, for a mass in the abdomen, first noticed by a physician six years ago, but not felt by patient till the preceding June. The mass had increased rapidly since that time, and the patient had severe backache, with cramp-like pains in abdomen. Had lost about ten pounds in past few months.

Of her history it may be noted that her husband has tabes; that he at one time had gonorrhea and infected the patient. No history of syphilis in the patient. Wassermann negative.

Physical examination showed a woman of large frame, flushed face, somewhat labored respiration, lung borders with small excursions, generally increased voice and breath sounds and tactile fremitus; heart slightly displaced upward, rapid but regular. The abdomen was distended from pubes to epigastrium, both flanks bulging with fluid which reached one inch above the umbilicus on standing. Masses were easily felt in each lower quadrant and a similar one, somewhat larger than a baseball, was felt over the pubes. This mass reached the pelvic floor and was not movable. The cervix was drawn up behind the pubes.

Upon the advice of Doctor Hewlett and after careful consideration, a preliminary tap was made November 12, after a diagnosis of malignancy and ascites. About a gallon of cloudy, yellow fluid was removed, the patient being much relieved. Contrary to expectation, examination of the cell contents of this fluid by the Department of Internal Medicine, showed many amitotic division figures, but no cells showed mitosis. Differential count showed polynuclears 73.2 per cent, small mononuclears 24.7 per cent, large mononuclears .9 per cent, endothelial cells .7 per cent, degenerates .4 per cent. These findings indicated a low grade inflammation process.

In view of the apparently hopeless condition of the patient, who had been running a daily temperature to 102° and 103°, it was decided to attempt relief by operation. We have, then, this patient coming to the table with a hemoglobin of forty-seven per cent, reds 4,000,000, whites 14,250, many coarsely granular casts and albumin, blood pressure of 170, ascites, probably fluid in the chest, embarrassed respiration, and masses in the abdomen.

Exploratory operation by Doctor Peterson showed three large masses, the one on the left being very necrotic, which seemed to arise from the left ovary, and was adherent to the intestines and peritoneum. The center and right masses were practically free. The right mass was intraligamentous, apparently arising from the right ovary. These were removed quickly and a supravaginal hysterectomy done, the central mass being slightly attached to the fundus. The pelvis was packed with five yards of gauze which extended through the cervix into the vagina. Salt solution was given under the breast before leaving the table. The ether anesthetic was light, only four and one-half ounces being used.

On returning from the operating room at noon the pulse was small, rate 140-150; the head of the bed was raised, the usual rectal salines administered, and one-thirtieth grain of strychnin ordered every two hours for four doses. The patient became comfortable in the evening, temperature 101.2° with rapid, small pulse, but gradually became weaker and died the following day.

Autopsy.—Uterus, tubes and ovaries had been removed at operation. Ligatures and gauze pack (per vagina) were in place. No evidence of serious hemorrhage. No purulent collection in pelvis.

Microscopic findings by Doctor Aldred Scott Warthin.

Kidneys: Marked cloudy swelling. Intense acute passive congestion. Numerous casts. One kidney rather of the type of acute parenchymatous nephritis. The other kidney shows a subacute interstitial nephritis with obliterative arteriosclerosis.

Retroperitoneal lymph nodes: Large metastases of a peculiar adenocarcinoma with a very peculiar hydropic or mucoid degeneration of the cells. The cells are similar to those found in the ovary. The cancer cell nests lie in dense stroma of new formed connective tissue, which is quite fibroid and must have formed slowly. The reaction to these cells on the part of the neoplasm is relatively slight.

Original tumor: Material came to us in pieces so we are unable to say whether pieces examined represent one or both ovaries. There is a difference in structure in the pieces examined. Some of them show a myosarcoma. One piece shows an atypical stroma resembling somewhat ovarian stroma, the spaces of which contain many small cells undergoing a mucoid or colloid degeneration. It is very probable that these are carcinoma cells of the same neoplasm as seen in the retroperitoneal lymph glands. It is most probable that the tumor of one ovary at least was a complex teratoid tumor with malignant transformation of both epithelial and connective tissue elements. We are unable to say whether the material represents one ovary or both but it is hardly to be regarded as a case of simple myosarcoma of two ovaries as there is certainly a mixed tumor here. Another possible source of the tumor might be a malignant adenomyoma with malignant transformation in both its elements.

REPORTS OF CASES.

FORMING NEW ELBOW-JOINTS.

CYRENUS G. DARLING, M. D.
Department of Surgery.

The formation of a new joint following ankylosis is not a new procedure, but many new features have recently been added to the literature of the subject, which may prove of value to those who are interested in this line of surgical work. Of all the joints which can be restored to usefulness, the elbow has been considered the least difficult to handle. First, because of the peculiar arrangement of muscles, which allows for the removal of a portion of the bone without, to any great extent, interfering with complete muscular action. Second, the easy exposure of the ends of the bone may be affected and the removal of the diseased articular surface can be accomplished with little damage to the soft parts. Third, since it has been found that interposition of tissue between the ends of the bone is of special value in securing freedom of movement, tissues can be more easily secured for this than for any other joint. Fourth, since failure so frequently depends upon the presence of infection this joint is not so large but that it can be properly treated and the parts can be placed in a most favorable position for securing results.

Mr. W. T., aged thirty-eight, entered the University Hospital December 12, 1912, because of trouble with his right elbow. He is a man of good personal appearance and has never suffered from any disease that would have particular bearing upon his present condition. About three years ago a swelling appeared upon the prominence of the head of the radius which he calls a "wen". This was removed with good result. Shortly after this operation he received a blow on the outside of the elbow while handling some machinery. This blow did not break the skin, but the parts were quite painful. There was some swelling which became larger and larger and in about six weeks broke open. This opening occurred in August, 1909, and healed in October, 1909. Since that time the movement of the elbow has gradually become restricted. He has continued to perform his work with occasional swelling of the parts, but it did not break open again until six weeks ago.

When the patient entered the hospital there was a small area of swelling about the head of the radius with an opening in the center, which discharged a small amount of very thin pus. The forearm was flexed at a right angle and could not be extended. This was apparently due to contraction of the capsule and did not depend upon muscular contraction. A probe inserted into the opening passed into the joint.

Operation—An incision about six inches long was made along the posterior part of the joint, the tip of the acromion process being the center of the incision. The skin was dissected back to expose the soft parts and care was taken in separating them on the inner side, not to

injure the ulnar nerve. As the joint surfaces were nearly all destroyed, they were entirely removed. The hemorrhage was controlled by ligatures and a piece of tissue was interposed by dissecting loose the fascia of the triceps on either side from above downward, leaving the lower part attached. These flaps were turned in between the ends of the bones and fastened there by a stitch. Because of the presence of infection, a drain was inserted on either side and the wound closed. The drains were removed at the end of five days and since that time the progress of repair has been favorable.

LICHEN RUBER PLANUS.

UDO J. WILE, M. D.
Department of Dermatology and Syphilology.

I am showing this case as an example of one of the many skin diseases which is frequently mistaken by the practicing physician for syphilis. The distribution of the disease, as you may notice, is the same as that of secondary syphilis. It is associated in this case, with an adenopathy, and this disease is much more difficult of diagnosis by the practitioner from the fact that the mucous membrane of the mouth and the penis are the sites of predilection for the eruptive elements. This disease is known as lichen ruber planus and has, of course, nothing to do with syphilis. It begins as a rule on the wrists or on the ankles and gradually spreads over the entire body associated with more or less itching, the latter being especially marked when the patient is covered or warm.

Of further interest—and here again is where error is usually made —is the fact that the disease is readily amenable to mercurial therapy and when such a patient clears up upon the administration of mercury, a further link in the mistaken chain of evidence is forged and the patient is condemned to two or more years of treatment depending upon the conscientious manner in which the doctor treats syphilis.

The differential diagnosis is not difficult if one observes the eruptive elements in lichen planus. You will notice that each element consists of an angular, flat, shining, almost waxy-looking papule. This peculiar appearance readily serves to differentiate it from all other skin infections. Its etiology like so many other dermatoses is obscure. It is thought by some to be the result of a nervous shock, others still contend that it may have its origin in an infective organism, possibly of a protozoan nature. If this disease is allowed to run untreated, the papules rapidly coalesce and form patches; these in turn become hypertrophic and the condition runs a long chronicity.

In arsenic and in mercury we have excellent remedies for its cure. Personally I favor the use of arsenic in the form of a daily injection of the sodium arsenite. This rapidly controls the itching, the papules recede, leaving as a rule in their places a transitory brownish pigmentation.

SECONDARY SYPHILIS.—(Doctor Wile.)

I wish to present here a frank case of secondary syphilis for the members present to compare with the case of lichen planus, which I have just shown. One could hardly mistake this picture, but my purpose in showing this patient is not so much to show the eruption, as to point out the imprudence of incising bubos which are syphilitic in nature. You will notice in the left groin, that this patient has a bubo, exactly such as one would get with chancroid, but he has had absolutely no evidence of chancroidal infection. This bubo is the result of having incised the adenopathy following his chancre, and this now may be regarded as a chancrous gland in which secondary infection has taken place on account of the incision..

PEMPHIGUS VULGARIS.—(Doctor Wile.)

I should like to refer back to the case of pemphigus vulgaria which I showed at the previous meeting. As I predicted at that time, this case terminated in an early exitus. The patient after developing numerous denuded areas as a result of ruptured bullæ died of a terminal pneumonia about a month ago. It may be remembered that when I showed this case, I mentioned that we did not know anything of the etiology of this disease. The day after he died, I received the current number of the *Archiv für Dermatologie und Syphilis,* in which I found that Lipschutz of Vienna has discovered a protozoan parasite for this disease. This investigator has had the advantage of studying a number of pemphigus cases extending over a period of four years and he described four cases in which he was able to demonstrate the parasite in the contents of the bullæ and in one case, moreover, he was able to find it in the aspirated blood from the spleen. He describes two distinct forms, one of which is a signet ring form, similar to some of the malarial parasites. This he calls "cystoplasma oviforme". A second is composed almost entirely of nuclear material and this he calls "anaplasma liberum." This is, for the most part, extracellular. Lipschutz believes that the one form is simply a cycle in the development of the other. I examined a number of the blood smears from this patient but was unable to substantiate any of these findings in our case. If it is found that pemphigus is due to a protozoan parasite, we might have some hope of changing the prognosis of the disease. In favor of the protozoan origin, Lipschutz points out that arsenic and quinin are the only two drugs that have been of service in the treatment of pemphigus. In the particular case under discussion, my patient received six injections of neosalvarsan without the slightest benefit.

DISCUSSION.

Doctor James F. Breakey: I am very much interested in Doctor Wile's report of the findings of a possible cause of pemphigus. Lichen I think is a much more frequent condition than practitioners recognize. I have always considered it more or less of a neurosis

appearing and disappearing with marked nervous strain upon the patient. I have a surgical friend who has attacks of lichen on the wrists whenever he overworks, and with each surcease the lichen disappears regardless of other treatment.

DOCTOR REUBEN PETERSON: I understood Doctor Wile to say that these cases of pemphigus are not contagious. I presume he arrives at this conclusion from clinical evidence, since the true etiology of the disease is still rather in doubt. Would it not be wise to be a little careful and isolate these patients and take the greatest precautions in the care of a disease so very fatal? That would certainly be better than to take no precautions and some day realize that we had been mistaken and that the disease is contagious.

DOCTOR WILE (closing): With regard to the contagiousness of pemphigus, you may remember that I mentioned that there is a contagious form. This is entirely different from the disease under discussion. The contagious form is known as acute infectious pemphigus, common among butchers, tanners, and those who have to do with animal hides. It is an eruption which is attended with high fever and usually runs a very rapid fatal course, occurring in epidemics. Its cause is probably a streptococcus.

As Doctor Peterson has suggested, we base our theory on the noncontagiousness of pemphigus vulgaria purely on clinical grounds. So far as I know, no two cases of pemphigus vulgaris have ever been found in members of the same family, or coming from the same locality, and even if the disease is caused by a parasite, one need not necessarily assume that it would be contagious. Whether a parasite is shown to be the cause of pemphigus or not, I believe we are still justified on clinical evidence, in regarding the disease as noncontagious.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, FEBRUARY 12, 1913.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR.
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

THE TREPHINE OPERATION FOR GLAUCOMA, WITH EXHIBITION OF PATIENTS.

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I WISH to present to the society the reports of two cases of glaucoma on which I did the trephining operation for the relief of increased intraocular pressure. One a case of simple noninflammatory glaucoma, the other a case of congenital glaucoma or buphthalmia.

CASE I.—J. J., male, aged seventy years, English. Family history negative. Personal history:—Patient had the diseases of childhood, and gonorrhea. He had suffered no previous injury or disease of the eyes. He first noticed failure of vision in the left eye one year ago, which has gradually diminished until now reduced to light perception. The right eye became involved six months ago, and now vision is reduced to 3/60. Patient has suffered no pain, but has noticed a marked halo during the past three months. The lids were slightly congested and the deep scleral vessels injected. Marked arcus senilis, anterior chamber shallow, iris partially dilated and sluggish. Lens-beginning cataract in each eye. No details of fundus could be made out. Fields for form and colors markedly reduced in the right eye, absent in the left eye (Figure I). Tension oculus dexter seventy-five millimeters, oculus sinister one hundred five millimeters. Blood pressure one hundred seventy-five. Transillumination negative.

The patient presents a typical clinical picture of chronic noninflammatory glaucoma complicated with cataracts, except for absence

of pain in eyes and brow, which is present in about ninety per cent of cases.

October 17, 1912, I performed a deep iridectomy on the right eye, and trephined the sclera of the left eye, using a one and one-half millimeter trephine. As the disease was more advanced in the left eye, with a tension of one hundred five millimeters as against seventy-five in the right eye, I chose it for the trephining operation.

Both operations were performed without accident and I show the comparative results on the chart (Figure II). The tension in both eyes dropped to normal, and remained so in the left eye. The tension in the right eye—the one on which I did the iridectomy—gradually increased until at one time it reached fifty millimeters, and has not

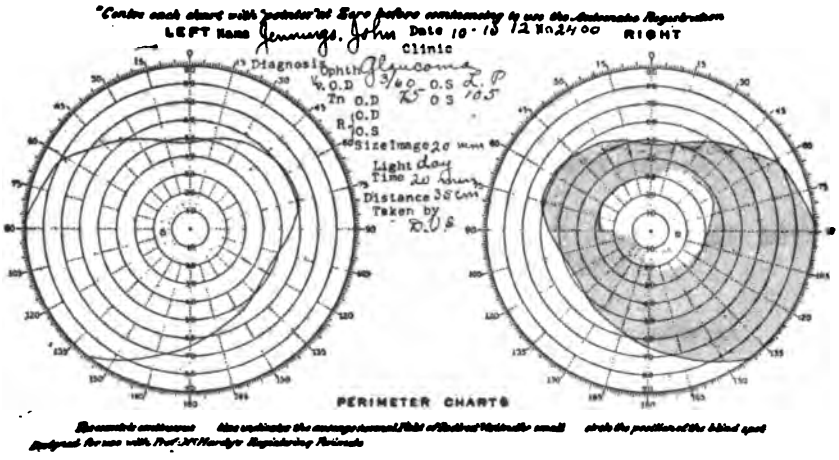

FIGURE I.

been below thirty millimeters until today. At the present time, seventeen weeks after the operation, the tension in the left eye is eighteen millimeters, and in the right eye twenty-two millimeters. The iridectomy was surgically perfect, but the case was unfavorable for restoration of vision because the disease is so far advanced. However, the condition was even worse in the left eye, so a comparison of the efficiency of the two methods of operation is possible.

CASE II.—M. M., aged three. History:—At the time both eyes were large and blurred in appearance. The child never had good vision. Subject to recurrent attacks of pain and inflamation, with intense photophobia. Present condition:—Right eye. Examination made with great difficulty because of intense photophobia. Conjunctiva but slightly injected. Cornea fifteen millimeters in diameter, hazy, central area roughened, whole cornea stippled and grayish in appearance, many minute elevations some of which are confluent. Anterior chamber deep, pupil dilated. No posterior synechia. Unable to take ten-

sion with tonometer. Finger tension + 2. Left eye the same as the right. Lens cataractous.

The patient's eye presents a typical picture of buphthalmia in which the cornea is becoming opaque. In view of the general dissatisfaction following the treatment used in this class of patients up to this time, together with the satisfactory results obtained from trephining the sclera in reducing the tension in adult eyes, I decided to trephine both eyes in this case.

February 3, 1913, operation was performed, after the method of Elliott; no accident. The tension taken after ether had been adminis-

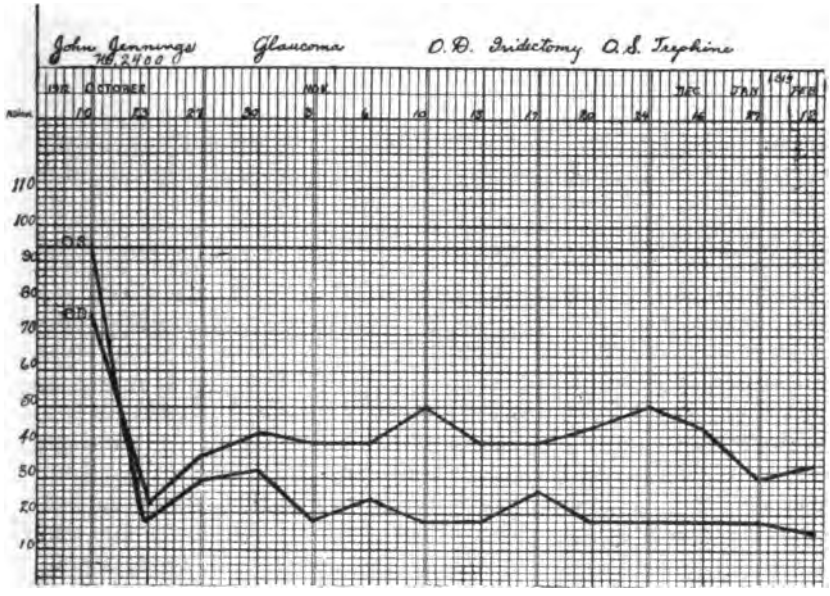

FIGURE II.

tered was found to be oculus dexter forty-eight millimeters: oculus sinister forty-eight millimeters.

While slight reaction followed the operation, the tension is apparently normal as taken by the fingers ten days after the operation. The ultimate result in this case cannot be foretold, but the results in cases of acquired glaucoma have been so good I hope we may add something to the treatment of this deplorable condition.

Congenital glaucoma can usually be accounted for by some defect in the main channels through which the intraocular fluid escapes from the eye. The cornea and the sclera in an infant's eye are very nonresistant and increase in tension occurring at that stage of life causes them to stretch, the whole globe becoming enlarged, producing the appearance of a bullock's eye, hence the term buphthalmia. The average diameter of the cornea in the human eye is considerably less than

one-half the anteroposterior diameter of the globe, while in all other mammals it is more than half, except in the higher apes. In the human fetus the relative size of the cornea to the globe resembles that which is met with in the lower animals.

The condition usually affects both eyes. It progresses slowly. The anterior chamber is deep and the lens frequently becomes cataractous. As the disease advances, vision is slowly reduced and sometimes entirely lost. In some cases the cornea remains clear, in others it becomes cloudy.

Treatment is of little avail. The usual treatment for glaucoma—pilocarpin or eserine—may be employed, and later iridectomy. Prognosis for satisfactory vision is unfavorable.

The author, Doctor Elliot, describes the operation of trephining the sclera for glaucoma as follows:

"The operation may be performed under the local influence of cocain and adrenalin, dropped in the sac. If there is much pain or congestion, or, if the patient is unruly, a hypodermic injection of morphin may be given twenty minutes before the operation. In recent cases we have been using subconjunctival injections of cocain and adrenalin with excellent results. The patient looks down, and a large triangular flap of conjunctiva is dissected up from above the cornea, the attached base of the triangle lying at the sclerocorneal margin. Experience has shown the importance of dissecting this flap right up to the limbal attachment of the conjunctiva. The flap is turned down on the cornea. The spot selected for the trephining should be as close to the limbus as possible, and should be prepared by using the scissor points freely, either cutting or scraping, or both, right down to the scleral coat. It is important that no conjunctival tissue be left, as otherwise it will catch in the trephine and tend to draw the flap into the latter as it is working. I never pull on the flap, but simply steady the globe by pressing on the cornea through the down-turned flap; I find this quite sufficient to effect the purpose of keeping the eye at rest in the proper position. The trephine is used with quick, light movements, and care is taken that its first application suffices to bite into the sclera, before it is raised to see the progress made. Once a clear ring is thus started, it is very easy to replace the trephine in it. At first the operator feels the need of frequently removing the trephine to watch progress, but he soon learns to know by the feel when he is through. As soon as the anterior chamber is tapped, aqueous fluid wells up alongside the trephine; even apart from this, there is a curious sucking sensation which tells one the trephine is through. Moreover, the patient often helps by a slight movement due to the pain (seldom severe) which attends the completion of the section. The conjunctival flap is replaced *in situ* to see whether the iris is in position or not. If it is, and if there is no bulging of its base into the wound, the eye is at once closed. It sometimes happens that the iris bulges into the section the moment the disc is cut through; if so, it is snipped with

scissors to let the aqueous fluid escape, and it then often goes back of itself. If it does not, then an iridectomy is performed. As a rule, a very small and peripheral section of the membrane suffices; more rarely it is necessary to make the iridectomy complete. We instill eserine drops into the eye after the operation, if for any reason we fear a prolapse may take place. As a rule, no drops whatever are used immediately after the operation. We have used Bowman's trephine throughout in Madras, and are still wavering between one of two millimeters diameter and one of two and five-tenths millimeters."

Elliott also emphasizes the following:

"(1) It is possible by using the points of the scissors and dissecting concentrically with the cornea, to get very close to the limbus. In doing so one must keep the points directed towards the plane of the posterior pole of the lens; one must not dissect tangentially to the eye. If one does the latter, one quickly buttonholes the flap; if the former, one undermines the limbus and makes a deep groove overhung by the latter. It is the making of this overhung groove which determines that one enters the chamber with the trephine with certainty.

"(2) If the trephine used is a sharp one, one can quickly, easily, and with certainty cut out a clean disc every time, with a reservation that in a large number of cases the disc remains attached at one small point, where the uncut tissue acts like a hinge; one clean snip of the scissors severs this, leaving a clean cut circular hole with no ragged edges whatever. I have recently made a point of pressing a little more on the corneal than on the scleral edge of the disc I am trephining so as to make sure of entering the chamber as far forward as possible.

"(3) If a clean disc is thus cut out, without due pressure of the trephine, one comparatively seldom requires to interfere much with the iris."

The trephines used are either the hand trephine of Stephenson or Bowman, or the mechanical instrument as used by Von Hipple (Figure III).

Remarks.—By glaucoma is meant an increase in the intraocular pressure. It may be primary or secondary, inflammatory or noninflammatory. The inflammatory may be acute or chronic.

If primary, the increase in pressure sets in without demonstrable cause. In the secondary type, the increase in pressure is the result of some other disease in the eye. I shall speak only of the chronic noninflammatory type.

Generally speaking there are two chief theories which have been advanced to account for the rise in pressure: one, the hypersecretion theory, which contends that it is due to an increase in secretion as a consequence of some form of nervous irritation; the other, the retention theory, that it results from a mechanical obstruction which is offered to the outflow of fluids from the eye. The retention theory is the one most generally accepted.

The few who favor the hypersecretion theory endeavor to reduce the hyperemia which they regard as the cause of the disease by operation on the sympathetic system (excision of the superior cervical ganglion), while the vast majority of operators aim at some procedure which will be most effective in increasing the possibility of the outflow.

Miotics will undoubtedly control the increased pressure in a limited number of cases. But one should not continue in their use in cases which do not show steady improvement, lest the opportunity for relief by operation be lost through permanent changes in the optic nerve as a result of the prolonged pressure.

Graefe's epoch-making discovery of iridectomy for the relief of

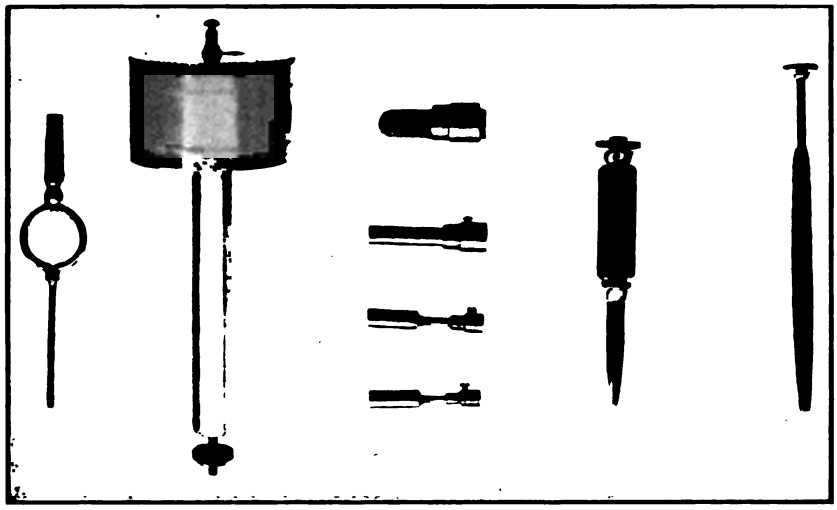

FIGURE III.

glaucoma, made in the year 1856, had for its object the freeing of the filtration angle by the removal of the iris base, thus permitting a more ready outflow of the aqueous into the venous system.

The methods of de Wecker and Lagrange have for their object the formation of a filtrating cicatrix free from iris tissue, while Herbert and Holth attempted to accomplish the same results by producing incarceration of the iris.

The operation of trephining has for its object the establishment of a filtrating cicatrix which affords an escape of aqueous under the conjunctiva when it is readily absorbed. The operation may, however, be combined with an iridectomy.

While our experience in the use of the trephine is limited to seventeen eyes in eleven patients, the results obtained have averaged better than those obtained from iridectomy. At present I see no reason why we should not continue in its use although, of course, it will take many more cases to warrant definite conclusion.

DISCUSSION.

DOCTOR GEORGE SLOCUM: I have watched this operation in its new application with great interest since its adoption in our clinic. It is always a source of great disappointment to see a case upon which we have done a successful operation, where apparently everything is satisfactory, and surgically the appearance of the eye is everything that can be desired, in which notwithstanding our efforts the vision has been lost. In the few cases upon which the trephine operation has been done, it has been so satisfactory that it seems as if we had adopted one of the greatest advances that has been made in the treatment of glaucoma. The operation of trephining the fibrous coats of the eyeball is not new. It was first done by Reisenger away back in 1828 for the making of an opening in an opaque cornea for the removal of a button of scar tissue preparatory to the transplantation of a button of rabbit's cornea for the restoration of vision. Subsequent modifications of the original operation have been attempted, such as the insertion of a minute button of glass in the trephine opening by Nussbaum in 1856, and later the substitution of healthy human cornea for that of the rabbit. The trephine of Von Hipple was devised for the corneal operation, and the inventor has published some good results. The later operation, using human cornea, has been done a number of times in the larger clinics of both Europe and America, but most frequently probably in the clinic of Ernst Fuchs, in Vienna, who has in suitable cases been using a human corneal button for many years. The application of trephining to the treatment of glaucoma is, however, quite recent. While the number of cases operated are as yet too few in number for conclusions to be drawn, when one sees the very favorable results in the cases that have been operated in our clinic one wonders why it has not been earlier adopted in the treatment of this disease.

DOCTOR ALBION WALTER HEWLETT: I should like to ask Doctor Parker what is the prevailing opinion of ophthalmologists concerning Doctor Martin Fischer's theory of glaucoma. Doctor Fischer has advanced the theory that nephritis and edema are due to acid products in the body, and he has extended this theory to a case of glaucoma. The theory so far as relates to nephritis and edema, has met with violent opposition on the part of internists.

DOCTOR PARKER (closing): Replying to Doctor Hewlett's question concerning the uses of subconjunctival injections of citrate of soda as suggested by Doctor Fischer. My experience is limited to six cases, but in no case was the result anything like as good as I had hoped it might be. In a few instances the tension was reduced for a short time after treatment, but no permanent good was observed in a single case.

THE INDICATIONS FOR ABDOMINAL CESAREAN SECTION.

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IT is not the purpose of this paper to make an exhaustive study of the many indications for abdominal Cesarean section. Such a review, while it might possibly be made interesting and profitable to the obstetrician, would be out of place before this body of general surgeons and gynecologists, whose work, as a rule and from choice, is not along obstetric lines. Therefore, I propose to discuss some of the more important and commoner indications for the operation under consideration, illustrating the various indications by cases from my own practice.

First, let me say that it is my belief that the chapter on the indications for abdominal Cesarean section must be rewritten, on account of the great advances made in the technic of the operation. Undoubtedly the results of abdominal Cesarean section will be still more satisfactory, once the surgeon comes to a full realization of the fact that, unlike the intestine, the stomach, or the bladder, the pregnant uterus, where sepsis from below is present or liable to develop, cannot be incised by the abdominal route without grave danger of a fatal issue from peritonitis. It is difficult to keep this difference in mind. Still it must be done if the indications and contraindications for the operation are to be intelligently studied.

Obstetrics is perhaps one of the most, if not *the* most conservative departments of medicine and surgery. The obstetrician, among other things, gives up a great deal of time to the consideration of how the fetus or passenger shall best be conducted through the pelvis or the passage. Sometimes the latter is narrow or otherwise obstructed. Sometimes the fetus in itself or in its position is at fault, and complicates the problem. At other times the difficulty lies with the power, or uterine contractions. The obstetrician's art consists in unraveling the tangle and so changing conditions as to make it possible for a live child to be born by the natural passages. And giving up so much time and thought to the problem, he very naturally is somewhat contemptuous of the surgeon who, waving aside the problem outlined above, settles the question by removing the child through the abdomen. Now I must confess that my sympathies are chiefly with the obstetrician. I am afraid that I am not any more in accord with the surgeon who does an abdominal Cesarean section on the slightest provocation than I am with the operator who does not attempt to make a diagnosis of an abnormal growth, on the plea that such a procedure is useless, since he will find out what is the matter after the abdomen is opened. Neither operator is playing the intellectual game fairly; each is seeking the path of least resistance.

However, while my sympathies may be with the obstetrican, I cannot but think he has been at times ultraconservative, and that the results for both mother and child being obtained by the advocate of the abdominal route should lead him to revise his opinions, and see if at times prejudice has not prevented his adoption of certain procedures. To put it another way, the only right the obstetrican has to demand that the child be born through the natural passages is through his ability to show that by so doing a better mortality and morbidity for mother and child will result. When, through ultraconservatism or a desire to maintain a position at all hazards, the obstetrician's statistics in any class of cases compare unfavorably with those advocating more radical methods, the accoucheur is fighting a losing game. And the sooner he realizes this, the better will it be for his patients and for himself. Perhaps an illustration will help to make my meaning clear. For generations past, medical students have been taught when and how to apply high forceps. Teachers and pupils have become expert operators, and in many instances have saved the children with no injury to the mothers. However, if it were to be shown that, in a given series of cases with heads at the superior strait, better maternal and fetal results follow abdominal Cesarean section, there should be nothing to hold the obstetrician to the subpubic route. Just because in the old days the results with high forceps were superior to intra-abdominal methods, it does not naturally follow that the same holds true today. All of which goes to prove that obstetricians, as well as other people, while holding fast to old and tried methods, must be open to conviction and be broad enough to accept the new if that be shown superior.

The classification of Routh seems most suitable for a consideration of the indications for abdominal Cesarean section. I shall take the liberty of only including the more common indications, conditions one is liable to meet with in the ordinary course of hospital or private obstetric practice.

(1) Obstructions to labor:
  (a) pelvic contractions,
  (b) fibromyomata,
  (c) ovarian tumors,
  (d) stenosis of cervix and vagina,
  (e) miscellaneous.
    1—previous ventrofixations,
    2—large size of child.
(2) Uterine hemorrhages:
  (a) concealed accidental hemorrhage.
  (b) placenta previa.
(3) Constitutional crises:
  (a) eclampsia.

I.—OBSTRUCTIONS TO LABOR.

(*a*) CONTRACTED PELVIS.—Probably more Cesarean sections will be performed for this indication than for any other. A few years ago a comparatively rare operation, and performed only as a last resort, under unfavorable conditions and with correspondingly bad results, abdominal Cesarean section has now become an elective operation. It is now undertaken with full confidence that in clean cases the most satisfactory results will follow.

The operation is imperatively demanded in cases where the conjugate vera measures seven and five-tenths centimeters or less, and the child is living. When the child is dead and the true conjugate is six and three-tenths centimeters or under, Cesarean section is still indicated, on account of the danger to the mother of attempts to deliver the craniotomized child through such a small pelvic diameter.

It must be borne in mind that there is much uncertainty as regards pelvic measurements. Until the patient with a medium contraction of the pelvis, say with a conjugate vera of from eight to nine and five-tenths centimeters, has had a test of labor, it is impossible to say whether she will be able to have a child through the natural passages or not. Therefore a primipara with a pelvis within these measurements should be given a test of labor. If after a suitable trial the head is still above the superior strait, with no progress, Cesarean section is indicated or the advisability of pubiotomy should be considered.

The following case will serve as an illustration.

Case I.—Miss L. M., aged twenty, primipara. Pelvic measurements were: interspinous 20, intercristal 21.5, bisischial 9, true conjugate 8. Diagnosis—generally contracted pelvis. Patient was in labor twenty-four hours, with no engagement of the head. Abdominal Cesarean section, January 20, 1909. Mother made a good recovery. Child lived twenty-four hours, and died from enlarged thymus.

Looked at from another standpoint, the criticism might be made that the case was treated too conservatively, and that the conclusion could have been reached even before labor, that a natural birth with such measurements was impossible. But just here enters the element of doubt because the patient was a primipara, and an unknown quantity so far as her ability to drive a child of a certain size through this particular pelvis. As long as the patient was not subjected to repeated vaginal examinations and attempts at delivery from below, if the membranes were unruptured and she were not exhausted by long continued labor pains, her chances with an abdominal Cesarean section were not diminished.

On the other hand, had the case been neglected, had the patient been repeatedly examined and many attempts made to deliver from below, abdominal Cesarean section would have been strictly contra-indicated. Under these circumstances it would have been far better obstetrics in my opinion to perform a craniotomy. For a Cesarean

section under such circumstances would have meant almost sure sepsis and probable death of the mother, with very slight hope of saving the child, already jeopardized by attempts at delivery from below.

The case is different with multiparæ who have had a number of tests of labor and have lost their children from forceps or attempts at version or from other obstetric operations from below. Under these circumstances it is wise to raise the limit of the extent of pelvic contraction where an elective Cesarean section is advisable.

The following is a case in point:

Case II.—Mrs. L. M., aged thirty-five, IX-para. First child born at seventh month; next two children at full term, and lived. Instruments used on last five children, one of whom died. Pelvimetry—Interspinous 20, intercristal 24, external conjugate 18, true conjugate 9. Diagnosis—generally contracted flat pelvis. Abdominal Cesarean section March 17, 1907, at the onset of labor pains. Mother and child made good recoveries.

This patient was so well pleased with the results of the operation that she reentered the hospital thirteen months later for another Cesarean section, which was performed for the same conditions. Again mother and child made good recoveries. At this time, however, at the request of the patient and her husband, the tubes were cut and buried beneath the peritoneum, in order to sterilize the patient.

(*b*) Uterine Fibromyomata as Indications for Abdominal Cesarean Section.—Luckily, women with uterine fibroids either do not conceive or else they abort within the first three months of gestation. The reason for the early termination of the pregnancy is very apparent if one studies the ovum where the pregnancy was accidentally discovered after hysterectomy or where the uterus was removed without reference to the pregnancy. During the past five years I have been able to turn over four specimens of uterine fibromyomata complicated by early gestations of from two to three and one-half months to my colleague, Doctor G. Carl Huber, professor of embryology. It is very important to the success of Doctor Huber's embryologic studies that there be no pathologic changes in the material examined. For this reason, embryos obtained from abortion cases are rather unsatisfactory, for necessarily abortion is a departure from the normal. Hence it was hoped that in these four cases mentioned perfectly normal embryos could be studied *in situ,* yet in each instance the embryo was imperfect from degenerative changes due to hemorrhages about the ovum.

If the embryo escapes these changes and pregnancy continues, the treatment will depend upon the situation of the fibroid growth in the uterus and its relation to the pelvis. Also it must be borne in mind that a fibromyomatous uterus may be a handicapped organ, and that its contractile powers may be interfered with to such an extent as to permit of serious and at times fatal postpartum hemorrhage. Rarely is the uterus the seat of a single tumor; hence myomectomy after the

removal of the fetus by abdominal Cesarean section will be rarely called for. Fibroid tumors obstructing labor will almost always be cervical or intraligamentous growths. Other varieties will be lifted up out of the pelvis by the developing pregnant uterus, and will not as a rule obstruct labor. From the standpoint of safety to the mother it would seem best to do a Porro rather than the classical operation where the pregnancy or labor is complicated by uterine fibroids. However, in the case of a first pregnancy the mother should have the right to decide in favor of the retention of the uterus, so that future pregnancies will be possible.

The following is an example of a Porro Cesarean section performed at full term for fibroid complicating pregnancy:

Case III.—Mrs. A. F., multipara, aged forty-one. Normal pelvis. The last three confinements were terminated by forceps extractions. The patient nearly died from a postpartum hemorrhage, presumably caused by a large fibroid growth in the right uterine wall. Porro Cesarean section August 6, 1911. Mother and child made good recoveries.

(*c*) Ovarian Tumor Complicating Pregnancy as an Indication for Cesarean Section.—Ovariotomy during pregnancy is a perfectly safe and reliable operation, giving a mortality of three and three-tenths per cent, with labor induced in only sixteen per cent of the cases. With normal pelvic measurements and no reasons for thinking the patient should not have a normal confinement, Cesarean section would not be indicated, even if the ovarian growth were removed during labor. The indications for Cesarean section would be a cyst so situated that it could not be removed without first reducing the size of the uterus. Every experienced abdominal operator can easily recall ovarian growths, situated within the folds of the broad ligament, where eradication would have been exceedingly difficult, or even impossible, in the presence of a full-term pregnant uterus.

Another indication for Cesarean section set forth by Routh seems to me of value, namely, unusual rigidity or undilatability of the soft parts, as might occur in elderly primiparæ. In such patients a long, tedious labor might place too great a strain upon the recent abdominal wound, with perhaps serious results.

(*d*) Stenosis of the Cervix or Vagina.—By stenosis of the cervix in this connection is not meant a rigid cervix which fails to yield to labor pains, but a cervix which is the seat of extensive scar tissue, usually dating from a previous confinement. This cicatricial cervical tissue is usually associated with extensive scar tissue in the vagina, so that the passage of the fetus through the narrowed lower part of the birth canal would either be impossible or fraught with grave danger. Attempts at artificial dilatation of such scar tissue is also dangerous, because of the difficulty of limiting the direction and extent of the stretching, making Cesarean section a much less dangerous procedure.

Attempts at delivery of a large child through a contracted outlet not infrequently result in extensive tears of cervix and vagina, vesicovaginal fistula, and complete rupture of the perineum. Repair of these injuries often requires extensive plastic operations, where tissue must be borrowed from one part to repair another. While usually the defects can be remedied, the repaired vaginal canal is usually a mass of scar tissue. A second labor, even under skillful handling, will mean a second series of tears, ruptures, and fistulæ. Under such conditions an abdominal Cesarean section is indicated, and should be performed at full term as an elective operation.

The following is a case of this kind:

Case IV.—Mrs. T. D., aged twenty-nine, entered the University Hospital September 10, 1907. She had had three children, only the first of whom lived, the others having been stillborn. The last two labors were each over thirty hours in duration, and one child weighed fifteen pounds. Since the birth of the last child, three months ago, the patient has been unable to control her urine or feces. Plastic operations upon bladder and rectum closed the vesicovaginal fistula and complete rupture of perineum. So much scar tissue was left in the vagina that the patient was advised in case of subsequent pregnancy to enter the hospital for an elective Cesarean section.

(*e*) MISCELLANEOUS INDICATIONS. — 1 — *Previous Ventro- and Vagino-fixations of the Uterus.*—As has been shown from cases studied from the Johns Hopkins Clinic, the majority of patients subject to ventrosuspension of the uterus will pass through subsequent labors without mishap. But the number of cases presenting serious dystocia is so large as to render the operation unjustifiable in the child-bearing woman, when often less dangerous operations will answer just as well. The same will apply with even more force to vaginofixations, which have been especially disastrous where the women subsequently became pregnant.

Whenever, in a woman pregnant after a ventrofixation, the cervix is carried backward and upward near the promontory of the sacrum, and the uterus enlarges by distending and thinning the posterior uterine wall, an abdominal Cesarean section is a much safer operation than attempts at delivery from below.

Before I recognized the danger of ventrosuspension in subsequent pregnancies, I was obliged to perform two Cesarean sections on women who were previously operated upon in the University clinic. The two mothers and children made uneventful recoveries.

2—*Large Size of Child.*—The attempts to ascertain accurately the size of the child in utero have not been particularly successful. Careful palpation of the fetal parts, together with Müller's method of ascertaining the size of the fetal head relative to the inlet, and experience in many cases will throw some light upon the absolute or relative size of the child. Where the diagnosis of a very large child has been made, and this is borne out by the failure of the head to engage after many

hours of labor, Cesarean section is indicated even if the maternal pelvis be normal. This is illustrated by the following case:

Case V.—Mrs. C. W., aged twenty-two. Patient had had one dead child at term, the labor lasting three days and terminated by forceps. Pelvic measurements normal. The patient was allowed to labor over forty-eight hours, since there were no signs of maternal exhaustion. At the end of this time, since the head was freely movable above the brim, the cervix was dilated and an internal version performed. The buttocks of the child could not be delivered through the pelvic inlet. Abdominal Cesarean section was immediately performed and an eleven-pound child delivered. Mother and child made good recoveries, although the former had a slight sepsis, presumably caused by the manipulations from below.

II.—UTERINE HEMORRHAGES.

(*a*) CONCEALED ACCIDENTAL HEMORRHAGE.—In this grave obstetrical accident the child is usually dead, and any treatment will be directed toward saving the life of the mother. Cesarean section is indicated where the hemorrhage is severe, the mother's condition alarming and growing worse, and the cervix is so rigid as to require considerable time to secure dilatation enough to empty the uterus from below. Under such conditions probably better results will be obtained from abdominal than from vaginal Cesarean section, unless the operator has had considerable experience with the vaginal route. As in operations for ruptured ectopic pregnancy, where the patient is in collapse and the hemorrhage progressing, the paramount necessity is to stop the bleeding quickly, and this is best accomplished by the abdominal route. In concealed accidental hemorrhage, fortunately rather a rare condition, the indication is to stop the bleeding and stop it quickly, if the patient's life is to be saved. But whether the abdominal or vaginal route be chosen, the uterus after being emptied should be removed. For experience has shown that in the kind of hemorrhage under discussion the uterus does not contract as it is accustomed to when emptied, but is more apt to remain in a state of atony, which means death from postpartum hemorrhage. Hysterectomy is also demanded to guard against sepsis, which is very liable to develop after severe hemorrhage from the pregnant uterus.

(*b*) PLACENTA PREVIA.—Abdominal Cesarean section is only exceptionally indicated in placenta previa. In the majority of cases the cervix is soft enough to yield to dilatation, so that various intrauterine manipulations can be employed with a view of stopping the hemorrhage. In rare cases, as in old primiparæ, the cervix may be rigid and undilatable. That is, enough dilatation for effective intrauterine work could only be secured at the expense of time, which would increase the danger for the mother and probably prove fatal to the child. Under such conditions, if the mother has not been infected by manipulations from below, Cesarean section is indicated. The uterus should be

removed as the final step in the operation, for the reasons stated when discussing the treatment of concealed hemorrhage, namely, the increased danger from sepsis in the presence of severe hemorrhage.

III.—CONSTITUTIONAL CRISES.

(*a*) ECLAMPSIA.—For those who do not believe in the immediate emptying of the uterus as soon as the patient has been seized with eclamptic convulsions, neither abdominal nor vaginal Cesarean section are ever indicated. However, the majority of obstetricians believe that in the presence of eclampsia the uterus should be emptied quickly and with the least possible trauma. If the cervix is easily dilatable, neither vaginal or abdominal Cesarean section will be indicated. In the presence of a rigid cervix, however, either one or the other route is indicated, rather than the wasting of valuable time over slow cervical dilatation. In the majority of instances vaginal Cesarean section is the preferable operation, since it is performed from below without entering the peritoneal cavity. Where the pelvis is contracted, abdominal Cesarean section is indicated, provided the patient has not been infected from below by repeated examinations or unsuccessful attempts at delivery. Under such conditions craniotomy on the living or dead child is the preferable operation.

I am at the present time engaged in tabulating the results of 425 cases of eclampsia treated by abdominal Cesarean section, and some very interesting facts are being brought out. Not only has the literature been carefully searched and all recorded cases been collected, but many operators all over the world have been kind enough to furnish me with unpublished cases. Thus the statistics represent not the work of a few, but over two hundred operators.

The total maternal mortality, counting patients operated upon before the aseptic era, was thirty-six and nine-tenths per cent, while this was reduced to thirty-one and eight-tenths per cent if only the 317 patients operated upon since 1900 are counted. The fifty per cent mortality ascribed to abdominal Cesarean section in the treatment of eclampsia can be explained by errors in the selection of cases, for many eclamptic patients were subjected to the operation who were hopelessly septic. These patients did not die from the eclampsia or the operation itself. Many of them perished because of the poor judgment on the part of the operators. They would have died even if the operations had not been performed for eclampsia.

In 245 cases of eclampsia where there was no sepsis or very little chance of sepsis prior to the abdominal Cesarean section, the maternal mortality was only twenty-four per cent. It is significant that in fifty cases where operative procedure preceded the Cesarean sections, the maternal mortality was forty-eight per cent, the difference in mortality being due, not to the eclampsia, but to the sepsis accompanying the eclampsia, a condition which can be avoided once this relation of sepsis to Cesarean section is fully realized by the profession.

The results of abdominal Cesarean section for eclampsia so far as the fetus is concerned should be, and as a matter of fact are, gratifying in the four hundred twenty-five cases. In 317 cases since 1900, where the fetal statistics could be studied, the fetal mortality was only five and five-tenths per cent. Even this mortality is reduced to three and seven-tenths per cent in one hundred thirty-two cases where the sections were performed after from one to five eclamptic convulsions.

These statistics are quoted to show that the last word has not been said regarding the place of abdominal Cesarean section in eclampsia. At least, the statistics in over four hundred cases have shown beyond a doubt that no one is justified in dismissing the treatment of eclampsia by abdominal Cesarean section with a short statement that the mortality is so high as to make it an unjustifiable operation.

620 Forest Avenue.

THE RELATION OF PHENOLSULPHONEPHTHALEIN EXCRETION TO THE UREA CONTENT OF THE BLOOD.

JAMES HOWARD AGNEW, A. M., M. D.
INSTRUCTOR IN MEDICINE IN THE UNIVERSITY OF MICHIGAN.
ANN ARBOR, MICHIGAN.

SINCE its introduction by Rowntree and Geraghty, the phenolsulphonephthalein test as an index of kidney efficiency, has to a great extent superseded all other methods. However, the estimation in the blood of retained nitrogenous products, particularly urea, as an index of renal efficiency has, within the past few years, received an impetus at the hands of the French school, particularly Ambard and Widal, to such an extent that they arrive at very definite conclusions and prognosticate from the amount of urea found in the blood.

Since both of these methods are of comparatively simple application, it seemed desirable to run a parallel series of determinations by each, and the object of this work was to determine whether there was a relationship between the amount of phenolsulphonephthalein excretion and the amount of urea in the blood.

The method used for the determination of urea was a slight modification of that used by Widal and is as follows: Blood was taken from the patient, generally in the morning, after a practically protein free breakfast. The blood was obtained from the median basilic vein by puncture and allowed to flow into a vessel containing a little powdered potassium oxalate to prevent coagulation. From twenty-five cubic centimeters to thirty cubic centimeters were taken although but ten cubic centimeters are necessary for the determination. Of the blood thus obtained, ten cubic centimeters were added, drop by drop, to one hundred and fifteen cubic centimeters of chemically pure, acetone-free methyl alcohol, stirred well and filtered through a dry filter. One hundred cubic centimeters of the filtrate (corresponding to eight cubic centimeters of blood) were then evaporated at a low tempera-

ture on the water bath almost to dryness. The residue was taken up with a few cubic centimeters of distilled water, washed carefully into a ureometer tube, decomposed by sodium hypobromite, the volume of liberated nitrogen determined with regard to temperature and the equalization of pressure, and the amount of urea calculated from the volume of nitrogen found.

Serious objection to this method has been made on the ground that the hypobromite is inefficient, that it deteriorates rapidly, and that it attacks other nitrogenous bodies aside from urea. It is known that in a pure urea solution, not much more than ninety per cent of the urea is broken up, while in a mixture such as this we do not know what proportion of the urea is broken up nor to what extent other substances present are decomposed. The gas liberated might perhaps better be termed the "easily decomposed" or "hypobromite" nitrogen. However, we have used the nomenclature of the French school and are at present engaged in checking up the results by more accurate methods for the determination of urea.

Within one or two days of taking the blood, the kidney efficiency was also determined by the phenolsulphonephthalein test according to the technic of Rowntree and Geraghty.

A total of twenty-one observations upon fifteen patients have been made, and the results are given in the accompanying table. The phenolsulphonephthalein excretion is expressed as a percentage of the amount injected which was excreted in two hours. The urea is expressed in grams per liter, the upper limit of normal according to Widal being five-tenths gram per liter. The table has been arranged by placing the observations in a series according to diminishing phthalein output.

NUMBER.	NAME.	PHTHALEIN EXCRETION.	GRAMS UREA PER LITER.
1.	C.	72.	0.38
2.	Jos.	68.5	0.32
3.	Ben.	68.	0.42
4.	S.	66.	0.40
5.	Hep.	66.	0.46
6.	R.	60.5	0.65
7.	Bur.	58.7	0.49
8.	F.	56.	0.39
9.	W.	55.	0.55
10.	D.	51.5	0.38
11.	L.	48.8	0.59
12.	Hep.	48.3	0.16
13.	McV.	47.	0.71
14.	May.	34.	0.71
15.	T.	33.	1.007
16.	T.	29.5	1.24
17.	J.	17.	1.56
18.	J.	12.5	2.56
19.	J.		2.88
20.	J.	9.8	1.39
21.	J.	7.3	1.34

In general, it is seen that the two methods run parallel, that with a decreased phthalein output there is an increase of urea in the blood. However, there are several marked exceptions. Number twelve shows a phthalein excretion of forty-eight and three-tenths per cent and a urea content of sixteen-hundredths gram per liter, while number eleven with practically the same phthalein excretion shows a urea content of fifty-nine-hundredths gram per liter. This can be accounted for by the fact that patient twelve was very edematous and hydremic at the time the blood was taken and was also being flushed out with diuretics. Number five is the same patient at a time when all the edema had disappeared and it is seen that the urea content of the blood conforms to the gradually rising amount. Numbers fifteen and sixteen are observations upon the same patient, a definite uremia, and it is seen that the urea content is very high and rising with the falling phthalein excretion. Numbers seventeen to twenty-one are observations upon the same patient, a case of chronic uremia. It is seen that with the falling phthalein excretion there is a gradual increase in urea and then a sudden fall which remains constant. However, three weeks elapsed between observations nineteen and twenty during which time the patient became hydremic and edematous. She had also been on a very low protein diet, which would tend to reduce the urea content of the blood. Number six shows a phthalein excretion of sixty and five tenths per cent but with the high urea content of sixty-five hundreths gram per liter, while number seven with a lower phthalein excretion shows considerably less urea. Also numbers eight and ten show a phthalein excretion with a lower urea content than one would expect. I have no adequate explanation to offer for these results.

In general the urea content of the blood varies inversely as the excretion of phenolsulphonephthalein but the relation is not an absolute one.

DISCUSSION.

Doctor Albion Walter Hewlett: In the last few years considerable interest has developed concerning tests for renal efficiency. The two methods which Doctor Agnew has compared, depend upon opposite principles. The phthalein test determines the rapidity with which the kidney excretes a definite substance, the urea test in the blood determintes the degree to which the kidney fails to eliminate normal metabolic products. On the whole, the two methods yield fairly concordant results. It will be necessary to check up the urea test by more accurate methods. The method used is sufficiently simple to be employed in any clinical laboratory.

Doctor David Murray Cowie: I am not familiar with the test for rest nitrogen in the blood and accordingly cannot add anything to what has been said. Doctor Agnew has presented the subject in a very clear way. The relation between the phthalein and urea excretion is very prettily shown and in most instances it seems to be fairly uniform.

The time required for completing each test is said to be about the same. I am wondering if after all the phthalein test is not the simpler and more easy of application. Do you not have to watch the urea test more closely and thus consume more actual time? With a good colorimeter the phthalein observations are very quickly made.

DOCTOR JAMES H. AGNEW (closing): In answer to Doctor Cowie's question, I would say that the determination of urea in the blood is not complicated, especially in a clinical laboratory. The entire estimation can be completed in thirty or forty minutes and no special apparatus is required. At present we are using a modified burette in place of a regular ureometer tube.

REPORTS OF CASES.

A CASE OF DIABETIC COMA.

ALBION WALTER HEWLETT, M. D.
Department of Medicine.

The patient, Mrs. B., about fifty years old, was operated upon February 1, for a diseased mastoid, and was transferred to the Medical Department about February 6, on account of diabetes mellitus of the severe type. Immediately after the operation she was given the ordinary restricted diet and somewhat later was placed on a carbohydrate free diet, to which one hundred grams of bread a day were added. When first seen by the Medical Department her urine not only showed sugar but large amounts of acetone and diacetic acid. After her transfer, she was given one ounce a day of sodium bicarbonate. A few days later, her urine became neutral and the sodium bicarbonate was reduced to half this amount. The urine immediately became acid and remained so to the present time, even though the bicarbonate was increased to two ounces a day this morning. Since the operation she has been a little flitty and this morning was more distinctly delirious. She became unconscious late this afternoon. At the present time she has a strong odor of acetone on the breath, the urine shows a very marked ferric chloride reaction, and the respirations are of the deep type, characteristic of diabetic coma. The prognosis is extremely unfavorable.

A number of interesting questions arise in regard to this patient. In the first place, what relation did her operation bear to her coma? Even in an ordinary individual, anesthesia with ether or chloroform, is often followed by the appearance of acetone in the urine and in the case of diabetes, the acidosis tends to be increased after anesthesia. In addition the starvation which usually follows an operation and which is usually associated with a marked reduction in the intake of carbohydrates, favors the onset of coma, in diabetic patients. The danger of operating upon diabetic patients already showing manifestations of acidosis, is a very real one and the operation should not be undertaken except with a full realization of the dangers involved.

While it is probable in the present instance that the patient would ultimately have gone into coma, it seems very likely that the operation has accelerated the onset of coma. The second question which comes up in regard to this patient relates to the acid nature of diabetic coma. If acid intoxication be the sole cause of diabetic coma, which view is not universally accepted, then one ought to be able to prevent coma, if the patient can take sufficient alkali. Sodium bicarbonate should therefore be given to such patients in doses sufficient to render the urine alkaline. The healthy individual will develop alkaline urine after a relatively small amount of sodium bicarbonate, but in diabetic acidosis it is often necessary to give very large quantities to accomplish this purpose. Unfortunately in the present instance, the sodium bicarbonate was not kept up in large doses after the urine became neutral. Had this been done, the coma may have been diverted, or if the coma had developed in spite of the alkaline urine, it would probably have been due not to an acidosis but to an intoxication by some of the retained metabolic products. When a patient has once gone into diabetic coma, prognosis is always unfavorable. Intravenous injections of five per cent sodium carbonate solution, not infrequently brings the patient out of coma for a time, but the lasting recoveries from this method of treatment have not been very numerous.

DISCUSSION.

DOCTOR DAVID MURRAY COWIE: I should like to ask Doctor Hewlett if any edema occurred in this patient after the administration of the sodium bicarbonate? It is interesting to note that some diabetics will take very large amounts of sodium bicarbonate without showing water retention while others may show marked edema with comparatively much smaller amounts.

Doctor Hewlett spoke of the frequency with which acidosis occurs after anesthesia. This is a very interesting thing. It is due to an entirely different cause. It is believed that the appearance of acetone bodies in the urine of diabetics marks the time of glycogen depletion of the liver in this disease. Starvation acetonuria and acetonuria following cyclic vomiting, which may be looked upon as due to starvation, is brought about so quickly that it would seem impossible for it to be due to glycogen depletion.

DOCTOR HEWLETT (closing): Doctor Cowie's remarks concerning the development of edema, as a result of the administration of large doses of sodium bicarbonate, are very interesting. We have had two instances in the clinic where this occurred. One patient gained twelve pounds in two weeks and had edema of the extremities. When the sodium bicarbonate was discontinued, the gain in weight was immediately lost and the edema disappeared. I wish to emphasize again the danger of a sudden restriction in diet in diabetic patients already showing acidosis. In more than one instance this has precipitated coma.

EXHIBITION OF A BABY SHOWING HYPODACTYLISM AND THE MOTHER WITH WEBBED TOES.

LESLIE H. S. DEWITT, M. D.
Department of Obstetrics and Gynecology.

The baby presented tonight shows but two toes on the right foot. The date of birth was December 19, 1912. The mother is an unmarried primipara, aged twenty-five. Her history is negative except for a luetic infection of four years standing, the Wassermann test being strongly positive at the eighth month of her pregnancy.

The baby's blood at birth showed a negative Wassermann reaction and thus far no symptoms of lues have developed. The *x*-ray plate shows two phalanges in the large toe while the phalanges and metatarsals of the outer three toes are absent. The skiagram of the left foot shows no lack of bones.

The mother is positive that no foot deformities existed in her family. Nothing from the family history of the father of the child can be obtained.

The skiagram of the mother's feet shows no absence of bones but the second and third toes of the right foot are webbed.

DISCUSSION.

DOCTOR DAVID MURRAY COWIE: Is there any history of deformity in the families of either parent further back than the immediate parents? The Mendelian law may apply in this case.

DOCTOR DEWITT (closing): There is no history of any deformity of any kind on the mother's side. As far as is known there is no history of deformity on the father's side. Further than that she knows nothing about it.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, MARCH 12, 1913.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR.
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

A CASE OF FULL TERM ECTOPIC GESTATION WITH A DEAD FETUS RETAINED IN THE ABDOMINAL CAVITY FOR EIGHT MONTHS.

REUBEN PETERSON, A. B., M. D.
PROFESSOR OF OBSTETRICS AND GYNECOLOGY IN THE UNIVERSITY OF MICHIGAN.
ANN ARBOR, MICHIGAN.

THE patient, whose case I desire to report this evening, was married and thirty-nine years of age. The family and personal histories are negative. We are principally interested in the present history which shows that she entered the Obsteric and Gynecologic Clinic of the University Hospital February 10, 1913, for enlargement of the abdomen and dragging pains. The abdominal enlargement dated from September, 1911. She had ceased to menstruate some months previously and thought herself pregnant. She suffered a great deal from pain through the abdomen, which kept her from sleeping. At the time she expected the baby she had pains, but did not give birth to the child. The pains ceased after a time and the abdomen became smaller but still was enlarged. She consulted a physician who pronounced the mass a fibroid tumor. She began to flow again in August, 1912, and has menstruated regularly ever since.

At entrance the abdomen was found distended by a mass which reached upward on the right side above the umbilicus. The mass was smooth, regular, nonsensitive, and fairly movable laterally. The pelvis was filled by a firm hard mass with which the cervix seemed continuous.

It is only fair to state that the patient entered the hospital just prior to the clinic, so that there was hardly time to work up the case carefully. While the mass was thought to be either a fibroid or a cyst, the fact that the uterus could be outlined just behind the mass led to an uncertainty about the diagnosis. As a further excuse for not making the correct diagnosis prior to operation may be stated the fact that only after the operation were we able to learn about the signs of pregnancy in September, 1911.

Operation.—The abdomen was opened by a median suprapubic incision. The mass was covered by dense omental adhesions. The tumor, surrounded by a hard firm capsule, arose from the left side of the pelvis and filled the culdesac. It was densely adherent to the rectum and sigmoid and extended diagonally across to the right side of the abdomen. The capsule was opened on its posterior surface and from within it was unrolled a doubled-up full-term fetus. The cord led to the placenta which was attached to the lowest part of the culdesac. The sac was densely adherent to the mesentery and intestines and could not be removed. Most of the placenta came away, although the remainder, with the sac, left a large mass within the pelvis, which was protected from the general peritoneal cavity by sewing together the edges of the incised sac with catgut. The large cavity remaining was filled with gauze, the end of which was led out through the incised culdesac into the vagina.

The patient did very well until the sixth day after the operation when an attempt to remove the gauze broke up the adhesions with resulting peritonitis and death.

The specimen which I present here consists of a full-term male fetus covered with fine lanugo and vernix caseosa and is papyraceous in part. The head, which is slightly above normal size, is flattened. The scalp, covered with dark hair, is folded upon itself. The cranial contents have in large part escaped. The upper and lower limbs are semiflexed. The features are fairly well developed. The hands are complete and well developed except the little finger of the right hand which is rudimentary.

Full-term extrauterine pregnancy, with the fetus alive or dead, is quite a rare condition, since rupture of the gestation sac usually in the early months puts an end to the pregnancy by killing the fetus. Sittner's admirable treatise on advanced extrauterine pregnancy with living fetuses leaves very little to be said upon the subject. From his careful studies we are able to come to many valuable conclusions. For example, if rupture is of very frequent occurrence in advanced extrauterine pregnancy, the operator has no choice but must remove the fetus as soon as the condition is diagnosed, for rupture would mean almost sure death to both mother and child. But Sittner has shown that rupture is not particularly common in advanced ectopic gestation, since operation was performed only eight times in one hundred and sixty-five cases or in only four and eight-tenths per cent. Hence we are

forced to consider the child and so arrange the time of operation as to give it the best chance for life. Again he is able to show that growth outside of the uterus does not necessarily mean weak or puny children, since of one hundred and twenty-two children delivered by operation in advanced ectopic gestation, over half lived beyond the first month, and eighteen and eight-tenths per cent lived beyond the first year.

Again only ten per cent of advanced extrauterine children were seriously deformed, hence deformities are not so frequent as to preclude attempts at saving the lives of the children.

Hemorrhage and sepsis are the two bugbears the surgeon has to contend with in these cases of advanced extrauterine pregnancy. The child is easily removed, but not so the placenta in some cases. Where the placenta is broadly attached to pelvis, mesentery, and intestines, attempts at removal may give rise to terrific hemorrhages. Yet if hemorrhage be avoided and the placenta left to come away later through suppurative processes, sepsis, often fatal, is inevitable. This again is shown by Sittner's statistics for from 1813 to 1906 the placenta was removed in ninety-five cases with a maternal mortality of twenty-one and five-hundredths per cent, while in seventy cases where the operator was forced to leave the placenta behind, the mortality was fifty-seven and one-tenth per cent. Thus we should remove the placenta whenever possible, even if to accomplish this, preliminary ligation of the large arteries and even compression of the abdominal aorta be necessary.

When the placenta cannot be removed, the best results have followed the stitching of the sac to the abdominal wall and protecting it and the placenta from the peritoneal cavity by gauze packing. Dependent drainage through the vagina should also be secured if possible. But whenever it becomes necessary to leave behind the placenta or portions of it, sepsis is only too apt to follow as in the present case.

620 Forest Avenue.

A CASE OF MALIGNANT MULTILOCULAR CYST OF THE OVARY IN A YOUNG GIRL.

DAVID MURRAY COWIE, M. D.

CLINICAL PROFESSOR OF PEDIATRICS AND MEDICINE IN THE UNIVERSITY OF MICHIGAN.

ANN ARBOR, MICHIGAN.

THE case I wish to present tonight is that of a young girl who entered the Pediatric Clinic February 2, because of a painless enlargement of the abdomen.

Mildred W., seven years old. Family history entirely negative. With the exception of pneumonia during the first year she has been perfectly well until the present trouble began.

Present Illness.—The patient entered school last September apparently well. Three weeks later it was observed for the first time that

her abdomen was distended. As she made no complaint, ate and slept well, the parents paid little attention to this. By December 27 the abdomen had become so large the father sought the advice of a physician. Cirrhosis of the liver and later tuberculous peritonitis was suspected. January 6 the abdomen was tapped and nine pints (four thousand three hundred twenty cubic centimeters) of a clear fluid were withdrawn (physician's statement). The doctor informs me that palpation, after the tapping, was negative. On the following day the father thought he could detect an enlargement in the right lower quadrant of the abdomen. This observation was confirmed by the attending physician. There was constipation when the abdomen was largest. At times the patient was obliged to urinate frequently during the day and was up several times during the night. Aside from these symptoms the patient insisted that she was well and complained when she was taken out of school.

Physical Examination.—Patient is forty-nine inches long. (Figure I.) Medium sized skeleton. The musculature is fairly firm. The skin is somewhat sallow, cheeks slightly flushed, elasticity of the skin is good; the panniculus is thin. There is slight but distinct edema over the left tibia. (Father says this has been more marked). Left calf twenty-six centimeters, right twenty-four centimeters. Mucous membranes are of fair color. Tongue, mouth cavity and teeth negative. The posterior cervical glands are slightly enlarged and hard. The joints are negative. Patella reflexes prompt, no ankle clonus. Pupils react to light and in accommodation. Extraocular movements negative. Thyroid is negative.

Thorax.—The thorax is symmetric, somewhat flattened above with flaring ribs below. The right shoulder is higher than left. The mammæ are distinctly enlarged. The nipples are prominent, dark brown, and Montgomery's tubercles are well developed with a wide brown areola. The back is fuller on the right from angle of scapula down. Skin is reddened over this area and around into axilla.

Lungs.—The expansion is good, symmetric. Apices high on either side. Right lung border at rib, nipple line, descends to sixth rib. There is dull tympany in Traube's space. Litten's phenomenon not seen on either side. Percussion and auscultation in front negative. There is slightly impaired resonance from the angle of the right scapula down and continuous with the liver dulness. Left lung border two finger breadths below angle of scapula. The breath sounds are feebler all over right as compared with left, which have a compensatory quality. Whispered and spoken voice are negative. Tactile fremitus equal behind, not felt in front.

Heart.—Apex is not seen, indistinctly felt in fourth interspace just outside nipple-line. Upper border (relative dulness) third rib, left just outside nipple-line, right, three and five-tenths centimeters. (Orthodiagram.) Greatest diameter of heart ten centimeters. (Ortho-

diagram.) Auscultation, et cetera, negative. (From this it will be seen that there was no upward displacement).

Abdomen is very much enlarged. It is above the level of the ribs and is distinctly fuller on the entire right side where there seem to be two distinct fulnesses, one from the right flank up to the rib margin

FIGURE I.—Abdominal Distention in a Child of Seven Due to Ascites and a Malignant Ovarian Cyst.

and over to the median line, the other below this curving to the left five finger breadths beyond the umbilicus down to the pubes. The abdominal veins are enlarged on both sides particularly on the right. The veins over upper right thigh are enlarged. The abdomen is tense. There is distinct fluctuation. There is dulness over the entire abdomen

excepting an area in the left flank and the epigastrium. Palpation at this time is unsatisfactory. There is a well marked deep brown linea nigra.

Genitals.—The labia are fairly well matured. The suprapubic hair is fairly abundant, short.

Tapping with diagnostic syringe brings away fifteen centimeters of light yellow fluid.

Menstruation.—Patient menstruated once in January and a distinct menstrual fluid flow occurred just before she was discharged from hospital.

February 21: The patient was tapped in clinic in the left lower quadrant, eight hundred cubic centimeters of light yellow fluid being withdrawn. After this a distinct mass could be felt just above and to the right of the pubes. It was hard, rounded, smooth and about the size of a small hen's egg. Rectal examination showed the uterus to be distinctly but slightly enlarged. An indistinct hard mass could be felt high up on the right side.

February 22: The mass in the right iliac region extended over a little to the left of the median line. It could be moved from side to side. Connected with this mass, which was hard and smooth, there was a cyst-like enlargement reaching up to the umbilicus. This had apparently developed since the tapping yesterday.

SPECIAL EXAMINATIONS.

Ascitic Fluid.—Clear light yellow fluid. Specific gravity 1017. Centrifugalization showed no cellular content. Further tests were not made.

Tuberculin Tests.—von Pirquet negative. Subcutaneous, two milligrams of tuberculin. After sixteen hours the temperature rose to 100° Fahrenheit, declining to normal in twenty hours. Highest temperature three days previous 99.4° Fahrenheit.

Blood Examination.—Red cells 4,900,000; white cells 16,000. Hemoglobin eighty per cent, Miescher. Differential count—Small lymphocytes twenty-five per cent, large lymphocytes seven and five-tenths per cent, transitional cells two and five-tenths per cent, polymorphonuclear cells, sixty-one and five-tenths per cent, eosinophile cells two and five-tenths per cent.

Urine.—Negative.

February 22: Patient transferred to Gynecologic Clinic with provisional diagnosis of ovarian cyst. The patient was operated upon the following morning by Doctor Howard H. Cummings and a large multilocular right ovarian cyst removed. Doctor Cummings' report follows:

"The abdomen was opened by a median suprapubic incision. The abdominal wall was very vascular, there being numerous bleeding points. In exploring the abdomen a thick walled cystic mass was found

which was attached to the anterior parietal peritoneum from just below the umbilicus almost to the diaphragm. The lower pole and the posterior wall were free from adhesions. The right horn of the uterus was drawn up by the right tube which was attached to the cyst. The adhesions were freed from the anterior abdominal wall and the tumor drawn down into the incision and delivered. This exposed the pedicle which came from the right broad ligament. The Fallopian tube was hypertrophied and extended out in the cyst wall. The cyst had its origin from the normal location of the ovary. The pedicle was clamped and the cyst removed. The figure-of-eight suture was passed through the pedicle and tied. This was transfixed and brought to the right horn of the uterus, sutured to the uterus and the raw surface covered with peritoneum. The pelvis was sponged free of blood. The left tube and ovary were perfectly normal. The uterus was fairly well developed for a child of seven. The omentum which was fastened to the upper pole of the cyst was brought down and the abdominal wound closed in the usual manner, silkworm sutures for retention sutures, the peritoneum closed with catgut, the muscles united with interrupted catgut sutures, the fascia closed with catgut skin clamps, silkwormgut tied over gauze roll."

The tumor weighed about three pounds. Some of the fluid had escaped. It was composed of one large cyst in the upper portion and several smaller ones varying from a hazelnut to a large sized olive.

Pathologic Diagnosis.—Doctor Aldred Scott Warthin reported the specimen to be a multilocular cyst of the ovary undergoing carcinomatous change, malignant teratoma.

Discussion.—The character of the ascitic fluid enabled us to disregard tuberculosis as the cause of the ascites. The very questionable subcutaneous tuberculin reaction was confirmatory evidence. The examination of the abdomen after tapping made it quite clear that in all probability the pathology was to be found in the lower right quadrant of the abdomen. Maturing of the genital organs and of the breasts, and the history of a menstrual discharge threw light on the probability of ovarian involvement. The size and suggestive feel of the mass as well as a knowledge of the fact that a large per cent of ovarian tumors in children are cysts, led me to the diagnosis which was confirmed by laparotomy.

There were two processes at work bringing about the fluid in the abdomen. Examination of the cyst after operation showed that it had not been punctured. Hydrostatic pressure would not distend the cyst much beyond its size at operation. By tapping of the left side of the abdomen I avoided entering the cyst wall. The eight hundred cubic centimeters removed evidently came from the peritoneal cavity. This was probably due to obstruction of the circulation and to a peritonitis of low grade which, as we see from Doctor Cummings' report, was marked enough to induce quite firm adhesions. These adhesions had

something to do with the larger bulk of the fluid being on the right side as described before.

While ovarian tumors in children are not rare they cannot be said to be common. Since Doctor Howard Kelley's collection in 1901 ("Keating's Encyclopedia of Diseases of Children") not a few cases may be found by consulting the literature. I have not attempted to do this. A résumé of Doctor Kelley's report will be of interest. These cases fell into two groups which may be arranged as follows:

Cystic tumors of the ovary.
- Adenocystomata.
- Unilocular cysts.
- Dermoid cysts.
- Teratomata.

Solid tumors of the ovary.
- Sarcomata.
- Carcinomata.

It was observed that most of the tumors in children under three years were dermoids and sarcomata. In later childhood adenocystomata with a few monocysts seemed to predominate. Of the one hundred and twenty-six cases operated upon fifty-five were multilocular and unilocular cysts with four deaths. Forty-seven were dermoids with ten deaths. Twenty-four were solid tumors with eight deaths. Fifty per cent of the children operated upon under three years died. This is of course a general statement without any reference to the character of the tumor. It is quite obvious that the malignant tumors are more likely to prove fatal. Cysts of the ovary have been found in infants as early as the eleventh month.

Lawrence Building.

DISCUSSION.

DOCTOR REUBEN PETERSON: I had no opportunity of examining this young patient since I was out of town when she was referred to the clinic. In my experience, it is quite rare to meet with ovarian cysts in such young people. Of special interest in this case are the signs of pregnancy present in a patient before the age of puberty due to the irritation resulting from disease of the ovaries. It is not uncommon to see the same signs in adults where the ovaries are inflamed or the seat of new growths, and this fact in connection with amenorrhea from other causes may cause the abdominal enlargement to be mistaken for pregnancy.

The ascites in this case is probably not due to pressure of the growth upon the return circulation, but to the malignant changes in the cyst. Small ascitic collections may be present both with ovarian cysts and fibroids, while larger collections are almost always due to ovarian fibroids or to malignant changes in the cysts.

The mortality with these cysts occurring in young patients before the menopause is quite high. This can be accounted for in two ways. First, because of the ascites, the diagnosis is often not made till rather late in the disease when the patient's strength has been so reduced that she easily succumbs to an operation. Secondly, young people do not stand prolonged anesthesia very well, yet the technical difficulties may necessitate prolonged operations.

The prognosis in this case is not particularly favorable, for malignant cysts are only too liable to return. Especially is this true if the cyst has been tapped and the contents have escaped into the peritoneal cavity.

Tapping ovarian cysts is not without danger, since the contents of the cyst may escape through the hole made by the aspirating needle, as I demonstrated in one case where I removed the cyst the day after an exploratory puncture. If the contents of the cyst be malignant or septic, the danger of tapping is still greater. Cysts then, should be removed and not tapped, except when dealing with infected ovarian cysts, where the best results can be obtained by aspiration through the vagina. The cyst can be thoroughly irrigated from below, then removed more safely from above.

Doctor Howard H. Cummings: At the time of the laparotomy it was found that the ovarian cyst was attached to the anterior parietal wall from a point just below the umbilicus almost to the ensiform; the lower border of the adhesions corresponding to the scar of the first tapping, which was done several months before the patient entered the hospital. To me this illustrates one of the dangers of tapping an ovarian cyst. Inasmuch as this is frequently followed by adhesions which complicate operative procedure, I believe the inflammatory reaction could account for the fluid found in the abdominal cavity. Macroscopic examination showed a small firm area near the base of the tumor which had undergone a carcinomatous change. However, the larger locules showed smooth walls and no evidence of carcinomatous involvement. As a rule there is danger of recurrence following the removal of malignant ovarian cysts, but the examination of this tumor shows such a small amount of involvement and because the cyst itself was not tapped, at least while the patient was in the hospital, makes me believe that the patient has a good chance for recovery. This prognosis is made more probable by the fact that there were no peritoneal nodules, no enlarged glands, and the patient's general health seemed to be very good.

Doctor Cowie (closing): As I said before I do not consider these cases particularly rare. I should class them as uncommon tumors of childhood. Since Doctor Kelley's report there have been quite a number of cases reported bringing the number up considerably higher. To this extent, as Doctor Peterson says, they are rare but they are not as rare as some other conditions we meet with in our clinical work.

A CASE OF HEMOLYTIC ANEMIA.

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THE patient, Mrs. F. M., aged thirty-four, housewife, entered the University Hospital on January 29, 1913, complaining of heart trouble, nervousness and swelling of the limbs. The family history is unimportant. There never has been any anemia or jaundice in other members of the family. The patient has had the usual children's diseases with good recoveries. Her husband is living and in good health. She has three living children. She miscarried the fourth and sixth pregnancies and had three still-births, the first, third, and eighth pregnancies respectively. The first menstruation occurred at the age of twelve, and from that time on was always regular. There is no venereal history. The present illness began eight years ago. Following the second miscarriage the patient had a thrombophlebitis of the left femoral, for which she was in bed ten weeks. Shortly after the onset of the swelling of the leg she suffered from painful swellings of the joints of the right leg, hip, and shoulder, which was diagnosed as rheumatism. At this time she became jaundiced. There were no clay-colored stools, no change in the color of the urine and no gall-stone colic. Since this the patient's leg has been more or less swollen, especially when she was upon her feet long at a time. In August, 1912, she had a similar attack in the right leg following a still-birth. At this time she was in bed for ten days with fever, and was unable to walk for five weeks.

The patient has complained of shortness of breath since the beginning of her trouble eight years ago. This has become more noticeable in the past six weeks, and is now accompanied by palpitations of the heart on moderate exertion. She also complains of pain in the precordium. She has lost fifteen pounds in the past year; the appetite is poor, and bowels are regular. The urine has been examined on several occasions but no albumin has been found. There is no numbness or tingling of the fingers or toes. The patient has never lived in malarial districts and thinks she has had no attacks of malaria. There never have been any hemorrhages from the mouth, nose, lungs or stomach. There never has been anemia or jaundice previous to eight years ago.

On examination the patient is well nourished, weighing one hundred and forty-two pounds. The temperature, pulse, and respiration are normal. She looks very pale and anemic and has a very pronounced pale-yellowish color of the skin, especially over the face and neck, suggesting pernicious anemia. The conjunctivæ are pearly white and the mucous membranes are very pale. Examination of the heart and lungs is negative. The abdomen is above the level of the ribs, with lax walls. The spleen is easily palpable, about two centimeters below the costal margin; it is firm, smooth, and somewhat tender. The firm smooth edge of the liver is palpable three finger breadths

below the right costal border. Palpation of the abdomen reveals no masses, muscle spasm or localized tenderness. The reflexes and radial arteries are negative. Examination of the urine is negative, no bile being present. Red blood count 3,500,000, white blood count 5,800. Hemoglobin thirty-six per cent. Differential count of four hundred cells shows small lymphocytes fourteen per cent, large lymphocytes eighteen per cent, transitionals four per cent, polymorphonuclears sixty-three per cent, mast cells one per cent, four degenerates. No nucleated red cells. Slight polychromasia and poikilocytosis, marked anisocytosis, many pessary forms. The Wassermann examination is negative. Blood pressure is 140 to 150. The stool is negative except slight positive occult test. On February 5 the patient's washed red corpuscles in a dilution of five per cent, added to descending dilutions of normal salt solution ranging from six-tenths to twenty-six hundredths, showed beginning hemolysis at a dilution of fifty-eight hundredths, with complete hemolysis at forty-five hundredths. In the control, hemolysis began forty-six hundredths, complete hemolysis thirty-hundredths. On February 12 the examination was repeated, hemolysis beginning at a dilution of fifty-four hundredths and was complete at forty-two hundredths. On February 17 the blood stained with Unna's polychrom-methylene blue after the method of Widal and Abrami, showed nine and five-tenths per cent granulo-recticulo-felemantosus.

Under treatment with ascending doses of Blaud's pills the patient improved greatly, the yellowish color of the skin disappearing. She was considerably less pale, and there was marked diminution in the size of the spleen and liver. On February 23, 1913, her washed red blood corpuscles subjected to hypnotic salt solution showed beginning hemolysis at forty-five hundredths, complete at thirty hundredths. The anemia was, therefore, associated with an abnormal lack of resistance of the red cells to hypnotic salt solution. A number of such cases have been reported in recent years under the term hemolytic anemia or when they are associated with jaundice as instances of hemolytic jaundice.

Minkowski,[1] in 1900, reported a series of cases traced through three generations and affecting at least eight members of a family, all of whom showed a chronic acholuric jaundice with splenomegaly and urobilinuria. In one of his cases an autopsy was obtained showing the liver normal and a small pigment stone in the gall-bladder, simple hyperplasia and hyperemia of the spleen with siderosis of the kidneys.

In 1907, Chauffard[2] reported a case of chronic splenomegalic jaundice with a marked fragility of the red blood corpuscles when exposed to hypotonic solutions of sodium chlorid. He later added two other cases. Normal human washed red blood corpuscles begin to hemolyze perceptibly in hypotonic salt solution at a concentration of forty-four per cent and hemolysis is complete at thirty hundredths. In Chauffard's cases,[3] hemolysis began at sixty-two hundredths, sixty-six hundredths and fifty-two hundredths respectively and was complete at thirty-

six hundredths, thirty-two hundredths and eighteen hundredths. No hemolytic properties were demonstrated in the serum of these patients, either against their own corpuscles or against those of other individuals. Chauffard has also shown that on vital staining an unusual number of the red corpuscles in this disease show a peculiar type of basophilic granulation. Victor C. Vaughan, Jr.,[4] has found that these granules are somewhat under one per cent in normal individuals. They are found as high as seven per cent in the newly born and have been reported as high as eighteen per cent in pernicious anemia with active regeneration. In congenital icterus with splenomegaly, the percentage is mostly over ten and figures as high as forty per cent have been reported. These observations have been confirmed by many and the clinical picture has been designated Chauffard's hemolytic jaundice. In this congenital form of the disease, the usual clinical picture shows that other members of the family have suffered from the same conditions early in life, sometimes immediately after birth, but occasionally not until puberty does jaundice appear. This jaundice is slight in degree, varying from a pale lemon hue to a well marked golden yellow. It is often remarkably variable, increasing under physical effort, emotion, et cetera. The stools are of normal color and the urine free from bile, but urobilin is frequently demonstrable. There is generally a moderate degree of anemia, red cells usually below normal in size, the color index somewhat reduced, and there is well marked polychromophilia. The leukocytes are usually normal or slightly increased in number, the differential count is often negative. A remarkable feature of the disease is that subjective symptoms are usually absent, excepting in a number of individuals who suffer from abdominal pain suggesting gall-stone colic. Five out of six cases autopsied showed small pigment stones in the gall-bladder.

The acquired form of hemolytic jaundice, first reported by Widal and Abrami[5] discloses a somewhat different picture, and has been divided into primary and secondary forms. There have been but a few cases of the primary form reported which has been called Widal's syndrome. The secondary form is observed as a transient condition associated with acute infections or poisoning, and as a terminal phenomena in some chronic diseases. The essential differences between the congenital and the primary acquired form are (1) the existence in the latter of an anemia sufficiently intense to occupy a prominent position in the clinical picture, (2) a blood picture which sometimes resembles pernicious anemia, and (3) the corpuscular fragility is less marked. Indeed when rewashed corpuscles are used no increased fragility may be present. Finally (4) corpuscles are not so numerous in the acquired as in the congenital form. The acquired syndrome usually follows some transient infection and then persists for years as an independent condition. It is more apt to produce symptoms than the congenital form. Up to 1911 the literature may be found in the articles of Thayer and Morris.[5]

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118 Twelfth Street South.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, APRIL 9, 1913.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR.
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

AN ANALYTICAL STUDY OF TUBERCULOUS INFLAMMATORY DISEASE IN THE FEMALE.

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TUBERCULOSIS of the female internal generative organs is relatively infrequent. Because of this, and the difficulty of making the diagnosis, also the remarkable manner in which this disease responds to treatment, these cases are of interest.

During a period of ten years, forty patients suffering from tuberculous inflammatory disease have been treated in the Gynecologic Department of the University Hospital. The last two hundred cases of pelvic inflammatory disease treated showed seventeen, or eight and one-half per cent to be tuberculous. This percentage is relatively high.

Age.—Tuberculous infections of the pelvic structures occur usually during the child bearing period and are frequent in young adults. These facts are well brought out by the following table:

TABLE I.—AGE.

YEARS.	NUMBER.
10—15	1
15—20	2
20—25	12
25—30	2
30—35	7
35—40	7
40—45	5
45—50	2
50—55	2
Total	40

The youngest patient was thirteen years of age, and two of the patients were fifty years of age. Over two-thirds of the cases developed during the period of greatest sexual activity, between the age of twenty and forty years. It would be implied that pregnancy has a definite casual relationship, and this seems to be substantiated by the following table. Several of the patients had a definite history of their symptoms developing following pregnancy or an abortion. Thirty of the patients were married, and of this number fourteen were sterile while the remaining sixteen patients had twenty-two children. There were no pregnancies among the ten unmarried patients.

TABLE II.—CONDITION AND NUMBER OF PREGNANCIES.

	NUMBER	NUMBER OF PREGNANCIES
SINGLE.	10	0 para
MARRIED	30	
	14	0 para
	6	1 para
	4	2 para
	4	4 para.
	1	7 para
	1	8 para
Total	30	

Etiology.—Pelvic tuberculosis, as in tuberculosis of any portion of the body, has as its etiologic agent, the tubercle bacillus. However, the question of the method of infection is interesting.

These explanations are given:

(1) Tuberculous foci in remote organs. As an example in pulmonary tuberculosis, the organisms can be carried in the blood stream and localize in the Fallopian tubes.

(2) The primary focus in the generative organs. This form of

pelvic tuberculosis seems to afford an immunity to other parts of the body (Howard Kelly).

(3) Tuberculosis of adjacent structures, as the bladder, rectum, intestines, omentum, and peritoneum.

(4) An ascending form of genital tuberculosis where the primary lesion is lower in the tract.

It is often impossible to trace the primary focus but all of the explanations given have been proven. In the cases studied from this clinic, ten had pulmonary signs which were diagnosed as pulmonary tuberculosis. It would seem that this route of infection is rather common.

At the laparotomy eight cases showed marked involvement of the general peritoneal cavity, intestines, and omentum. In these cases the peritoneal involvement seemed older than the genital lesions.

A posterior colpotomy was performed in eight cases so that the question of primary focus could not be decided.

In only one case was there a suggestion of the possibility of an ascending infection. The patient, aged thirty-nine, had given birth to four children. The husband developed tuberculosis and about one year later the wife complained of a profuse leucorrheal discharge. Following this she developed peritoneal symptoms. Murphy reports a very interesting case of an ascending infection. The semen of the husband contained tubercle bacilli and the wife developed tuberculous ulcers in the vagina and eventually a peritoneal tuberculosis.

Two patients gave a family history of tuberculosis and a third had nursed a far advanced pulmonary patient.

Pathology.—The pathologic pictures presented by the cases varied. In twenty cases the endometrium showed miliary tubercles and in three cases it was possible to stain the tubercle bacilli in smears from the cervix. The tubes and ovaries were most frequently involved, showing the lesions in thirty-four cases. Eight of the patients had a generalized miliary tuberculosis of the peritoneal cavity. The peritoneal cavity was opened from below in eight cases to drain abscesses (probably of the tubes). In these cases the condition of the peritoneum was only noted in one case. There was ascites in three cases and one chronic case showed a dry tuberculous peritonitis. This last case died following an exploratory laparotomy. The autopsy revealed the fact that all of the abdominal and thoracic organs were adherent to the body wall. The intestines could not be separated from the parietal peritoneum and the abdominal viscera had to be removed en masse. The inflammatory process was most severe in the pelvis where the omentum and pelvic organs could not be separated. The uterus was friable and caseous. The tubes, ovaries, omentum and sigmoid colon were matted together in one caseous mass.

Tubercles were found in the left lung, also one small cavity. A nodule was found in the right apex. In Table III the cases showing the various pathologic conditions are indicated.

TABLE III.—PATHOLOGY.

CONDITION.	NUMBER OF CASES.
Tuberculous endometritis	20
" salpingitis	34
" oöphoritis	34
" omentitis	20
" peritonitis of uterus	23
" general peritonitis	8
" abscess in culdesac	7
" involvement of broad ligament alone	1
" ascites	3
Tumors Complicated by Tuberculosis.	
Fibroid (subserous)	2
Cervical polyp	1
Necrotic myofibroma	1

Symptoms and Diagnosis.—The symptom most commonly complained of was abdominal pain. It was described as a dull aching sensation which became a severe pain at the menstrual periods. The pain was persistent. The majority of the patients suffered from dysmenorrhea and many had a profuse leucorrheal discharge. Burning and smarting upon urination was also a common complaint. The patients who were greatly debilitated had amenorrhea but more flowed profusely and this condition led them to their physicians. Gastrointestinal disturbances and repeated attacks of chills and fever were among the symptoms noted.

The diagnosis of pelvic tuberculosis is at times most difficult and is often revealed at the laparotomy. Howard Kelly gives three classes of cases where the diagnosis is not difficult:

(1) Where extensive pulmonary disease is associated with pelvic inflammatory masses.

(2) Where a persistent uterine discharge or uterine curettings are found to contain tuberculosis foci.

(3) Where there is pelvic inflammatory disease associated with irregular ill-defined masses with fluctuation in the lower abdomen, and the latter are noted at subsequent examinations to have changed their relation.

He likewise calls attention to mistakes due to healthy appearance of the patient and a negative family history.

Smears from the cervix and a curettment were used to establish the diagnosis in some of the cases. In eight cases a posterior colpotomy gave the definite diagnosis. One of the three cases showing ascites was diagnosed as loose-walled, adherent ovarian cyst, but on consulting various authors I find this is a common error. Three cases had been diagnosed as typhoid fever during the first illness.

Treatment.—It has been known for many years that an exploratory laparotomy had a beneficial effect upon tuberculous peritonitis

and that many cases were cured. It is also known that cases undergo spontaneous cures, but operative treatment holds out the greatest chance of recovery. A simple laparotomy is not sufficient to cure the condition where the focus is in the tubes or uterus. In these cases the primary focus having been removed, the peritoneal lesions will heal. There is a three-fold object in operative procedures (Howard Kelly):

(1) To remove the primary focus.
(2) To remove exudate.
(3) To break up dangerous adhesions.

The following table shows the value of operative procedures:

TABLE IV.

OPERATION.	PATIENTS.	COMPLICATIONS.	RESULT.
Bilateral salpingooöphorectomy and supravaginal hysterectomy	7	1 suppurating wound.	7 cured.
Bilateral salpingooöphorectomy and panhysterectomy	15	2 enterorrhaphy 1 phlebitis. 4 suppurating wound. 1 vesicovaginal fistula.	1 death, miliary tuberculosis. 13 cured. 1 improved.
Left salpingooöphorectomy	1		1 cured.
Left salpingectomy	1		1 cured.
Right salpingooöphorectomy	2		2 cured.
Bilateral salpingooöphorectomy	1		1 cured.
Laparotomy	9		4 improved. 4 cured. 1 died, dry tuberculous peritonitis.
Posterior colpotomy	8	1 urinary fistula	5 improved. 3 cured.
Appendectomy	2		1 cured. 1 improved.

There were two deaths among forty cases operated upon; a mortality of five per cent. One death was due to a generalized miliary tuberculosis and a second showed at autopsy, a dry tuberculous peritonitis. Supravaginal hysterectomy and bilateral salpingooöphorectomy gave the best results; the seven patients were cured and only

one abdominal wound suppurated. Panhysterectomy and bilateral salpingooöphorectomy gave good results but with numerous complications. Of fifteen cases operated upon, thirteen were cured, one improved, and one died. The complications were: tears in the intestines in two cases due to the friable adhesions and bowel walls; one case of phlebitis; four suppurating abdominal wounds; and one vesicovaginal fistula.

A simple laparotomy in cases with very extensive involvement resulted in four cases cured, four cases improved, and one death.

Posterior colpotomy upon eight patients caused a cure in three patients, improvement in five, and one urinary fistula developed as a postoperative complication.

The results as a whole were very satisfactory and show that pelvic tuberculosis, like pulmonary tuberculosis, is curable.

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DISCUSSION.

DOCTOR CYRENUS G. DARLING: The paper is very interesting. There was one case operated in the surgical department, which should have been added to this list. Some three years ago a patient was sent to the surgical clinic for operation with diagnosis of umbilical hernia. The patient was a large, fleshy, well nourished woman. Nothing was thought amiss in a general way, except that there was a slight rise of temperature. When we operated for the hernia a large amount of clear fluid was found in the abdominal cavity and the walls were studded with small tubercles. Both tubes were found enlarged and inflamed. The incision was prolonged in the median line and the tubes were removed. The hernia was repaired and the patient made an uneventful recovery. One is impressed by the serious complications which may enter into these operations. The most important one is when the tuberculous condition involves the intestines. In separating adhesions the wall of the intestine may give away. This may be easily repaired, but union may not take place. Wounds of the bladder may present the same difficulty, and may lead to the formation of fistulæ, which can never or only with difficulty be repaired. One should make a careful diagnosis as to whether the seat of the trouble is in the appendix or in the tubes. Loss of the tubes or impairment may prevent further pregnancies. One patient of eighteen who was operated for tuberculous peritonitis died four years later of tuberculous meningitis. Thus we find that many of these patients who are cured, so far as the pelvic condition is concerned, may die of tuberculosis in other parts of the body.

DOCTOR JAMES F. BREAKEY: I would like to ask Doctor Cummings, when he closes the discussion, for his opinion as to the most frequent points of primary tubercular processes within the abdomen; also is not tuberculous endometritis almost always a secondary process? also the relationship between tuberculous appendiceal trouble and tubal trouble. Sometimes when one gets rather mild appendiceal attacks in

the female, it is very difficult to determine whether the trouble originates in the appendix or in the tube, and it is also difficult to decide by gross inspection of a tube whether or not it is sufficiently involved in a tuberculous process to necessitate its removal, together with an offending appendix, or whether appendectomy is sufficient, trusting to the effects of the laparotomy alone to complete the cure of the tubal peritonitis.

Doctor Leslie H. S. DeWitt: The series of cases reported in Doctor Cummings' paper show how important it is for young girls suffering from menorrhagia to have a dilatation and curettage, as many of these cases will show beginning tuberculosis of the endometrium. It is highly important that the curettings be examined microscopically, no matter what the macroscopic appearance may be. Curettings which appear very insignificant when removed may show beginning tubercles when examined microscopically. It is a routine in the Gynecologic clinic that all patients having an operation should be curetted. All the curettings are examined microscopically and not infrequently tuberculosis or some other pathology has been found when it was not suspected in the least. Such was the case in one young woman who entered the clinic two years ago. The patient was suffering from dysmenorrhea and menorrhagia. A dilatation and curettage was performed and microscopic examination of the curettings showed tuberculosis. A laparotomy was performed and the pelvic peritoneum was studded with very young tubercles. The appendix was badly involved and it was thought that the appendix might be the primary seat of the trouble. It was removed and the whole abdomen and pelvis freely exposed to the air, and the abdomen closed. The patient made an uneventful convalescence from the laparotomy. About a year later she entered the hospital suffering from menorrhagia. She was given a second curettage and carbolic acid was swabbed over the interior of the uterus. Microscopic examination of these curettings showed advanced tuberculosis of the endometrium. The patient is perfectly well today, and apparently cured.

Doctor William Blair: I would like to ask Doctor Cummings to say something more about the urinary fistulæ. These are very interesting. I notice that both of these complications followed posterior colpotomy. It is interesting to one who has witnessed such operations, how easily the ureter can be injured. We often get a saccular condition where there will be a sudden gush of urine, and the patient will come saying that she cannot hold the urine. But after that sudden gush the patient will be able to urinate. I wish to ask Doctor Cummings whether there was a possibility of that in either of these cases?

Doctor Howard H. Cummings: Doctor Breakey has asked if tuberculosis of the endometrium is not usually secondary to tuberculosis in some other part. Pelvic tuberculosis, when it involves the endometrium, is secondary in the majority of cases, the primary focus

being in the tube. Cases of tuberculosis of the ascending type are rare. Five years ago I had the opportunity of working with Doctor Warthin in investigating tuberculous pelvic infections. We used rabbits, and injected the bovine bacillus into the peritoneal cavity. The autopsy and the microscopic sections showed the oldest lesions to be in the peritoneum, the tubes and uterus showing a younger process, the endometrium showing early miliary tubercles. The differential diagnosis between tuberculous appendicitis and tuberculous salpingitis is often difficult to make. The process is usually slow and insidious. Where the appendix is involved gastrointestinal symptoms occur. Vaginal examination would show a mass on the right side, which is sausage-shaped and usually adherent.

Doctor Blair calls attention to the complication of urinary fistulæ following a posterior colpotomy, and asks if the complication is due to trauma affecting the ureters. It is possible to damage the ureters and to tear the uterine artery. However, if in doing a colpotomy the finger is kept near the body of the cervix and in the median line there is but little danger of damaging these structures. Where the peritoneum is the primary focus, the pelvic organs being but little involved, a laparotomy will often cure the condition. However, if the tubes are the primary focus and the other pelvic organs are diseased, conservative operations give poor results. The internal generative organs must be removed even though the patient is very young in order to bring about a cure.

A CASE OF TUBERCULOUS PERITONITIS IN A CHILD.

WILLIAM A. STOOPS, M. D.
SURGERY INTERNE AT THE UNIVERSITY OF MICHIGAN HOSPITAL.
ANN ARBOR, MICHIGAN.

RAYMOND BARTON, schoolboy, seven years old, from Newberry, Michigan, entered the Pediatric service of the University Hospital on January 2, 1913, on account of enlargement of the abdomen, vomiting, failing strength and marked pallor.

Family History.—Father and mother are well. No evidence of tuberculosis in the family. Other children are well.

Personal History.—Patient was always well, until the present trouble. No children's diseases. Breast-fed during infancy. No digestive disturbances.

Present Illness.—Six weeks before entering the hospital parents first noticed enlargement of the abdomen, which was unaccompanied by other symptoms. Patient felt well, but the abdomen gradually continued to enlarge. During the two or three weeks previous to entering the hospital, he complained of feeling weak and tired, had pain in the stomach, vomiting about one hour after meals, varying in amount. This condition existed for one week. The vomitus was watery and contained partly digested food. Never constipated until recently when cathartic had to be given. Two or three nights before entering the

hospital patient awoke at midnight crying with pain in the pit of the stomach, only momentary. No urinary symptoms.

Physical Examination.—Patient is of slender frame, looks chronically ill, muscles somewhat wasted, skin is harsh and scaly over the entire body, no edema. Mucous membranes are slightly pale, tongue is clean and moist. Cervical glands are slightly enlarged. Right and left inguinal glands shotty, the largest about the size of a pea. Head and joints negative, no rosary. Neural examination negative. Chest is fairly well arched and symmetrical. Lower ribs are flaring, apparently due to intraabdominal pressure. Percussion and auscultation negative over the front, slightly impaired resonance over the left apex behind which is best made out by palpatory percussion. Spoken and whispered voice increased over this area (later these findings could not be confirmed). No râles or other adventitious sounds. Breath sounds are vesicular all over back and front. Heart negative, pulse normal. The abdomen is large and on a level with the ribs, which are pushed up, fairly symmetrical, larger above than below. Veins plainly seen extending up over thorax. Panniculus is thin. Recti are separated from the navel upwards. Liver indistinctly felt, two finger breadths below the costal margin. Spleen not palpable, and dullness not increased. Tympany over the upper abdomen down to the pubes. Dullness in both flanks. The dullness changes only slightly on change of position. Fluctuation wave not inhibited by hand in the median line. Right testicle much enlarged, three or four times the size of the left. This was first noticed about a week ago. The upper pole is hard, middle portion soft, and a nodule is felt in the lower pole. Blood, urine and stools negative. Radiograph of the abdomen was negative.

Patient entered the hospital on January 2, 1913, and on the fourth a von Pirquet test with a five and twenty-five per cent solution of tuberculin was made which proved negative. On the eighth we tried the subcutaneous test with one milligram of tuberculin and obtained a slight reaction at the point of injection. No definite rise in temperature, however. On the fourteenth we tapped the abdomen, and obtained about fifteen cubic centimeters of yellow slightly turbid fluid, which microscopically showed one hundred per cent lymphocytes. The specific gravity could not be definitely determined. A guineapig inoculated with the peritoneal fluid died in three weeks, showing positive signs of tuberculosis.

A provisional diagnosis of tuberculous peritonitis was made and the patient was transferred to the Surgical Clinic for laparotomy. He was operated upon by Doctor de Nancrède on January 18. An incision was made above the umbilicus through the right rectus muscle, and on opening the peritoneum about three hundred cubic centimeters of a clear straw-colored fluid escaped. Investigation showed both the parietal and visceral peritoneum completely studded throughout with small grayish tubercles varying in size not much larger than a pin-head.

No caseating tubercles found. No firm adhesions encountered. The intestines were freely exposed to the air, and manipulated. The appendix was exposed and amputated on the possibility of its being the primary focus of the infection. After irritating the visceral and parietal layers of the peritoneum with gauze, the intestines were returned, and the wound closed completely in the usual manner.

Convalescence was uneventful with the exception of a high irregular temperature. Previous to the operation the patient had been running an irregular temperature, between 98° and 100°. After the operation the temperature was irregular, being as high as 104°. It gradually declined to about normal on the fourteenth day. Under the usual plan of treatment for tuberculosis, rest, fresh air, sunlight, and forced diet, the boy's condition rapidly improved, and when discharged on February 24, five weeks after operation, indications pointed to an ultimate recovery.

This case is a good example of the simple exudative type of tuberculous peritonitis, in which surgical interference is accompanied by such good results. Ochsner has widely advised medical treatment at the outset of the disease in general. If progress is not favorable and steady, surgery should be called upon, especially when the infection is to all intent confined to the abdomen.

No entirely satisfactory explanation has yet been offered for the good results obtained from operation in these cases. Many theories have been put forth, such as exposure to air and light, hyperemia, formation of opsonins, et cetera. All surgeons agree that drainage must be avoided, as the liability to secondary infection, to necrosis of intestine and to transplantation of infection is too great. In the acute miliary ulcerative and the dry fibrinous type the treatment is essentially nonsurgical and the prognosis is bad.

DISCUSSION.

Doctor John H. Pettis: It is a fact that a great many of these cases get well with medical treatment, and it is also a fact that cases that are amenable to medical treatment are amenable also to surgical treatment. It has been suggested that the different types of tuberculosis represent various stages of the germ. Clinicians are not at all agreed as to whether surgical interference is essential to their cure. One noted man ended up by saying: "Laparotomy cures tuberculosis because it does not." The cases where laparotomy seemed to do the most good were cases where no medical treatment had been tried. It has also been demonstrated that the primary focus is not cured by the merely opening of the abdomen to light and air.

Doctor David M. Cowie: An interesting point in the case Doctor Stoops has presented is that which relates to the absence of symptoms during the first four weeks of the active stage of this patient's disease. The abdomen continued to swell but no subjective symptoms were present until two weeks before the patient entered the hospital. The occurrence of tuberculous peritonitis in children, or rather tuberculous

processes in the abdominal cavity, are very common; they do not, however, in the greater per cent of cases exhibit themselves as abdominal tuberculosis but rather as infections in some other part of the body or as a generalized acute miliary tuberculosis. In other words, in a large number of children who come to autopsy, tuberculous processes are found in the abdomen which have not developed to sufficient extent to be recognized by our clinical methods. We recognize three forms of abdominal tuberculosis in children: that form which involves the glandular structures in a marked degree (tabes mesentericus); an exudative and a plastic form. My first opinion in this case was that we were dealing with a plastic tuberculous process in the abdomen. I could not convince myself of fluid. Although there was dulness in the flank, tapping brought away only a small amount of fluid. Later, as Doctor Stoops has said, we were able to determine fluctuation. The cytologic examination of the fluid showed one hundred per cent of lymphocytes. This in itself is practically pathognomonic of tuberculous peritonitis.

At operation the amount of fluid was found to be small but the involvement of the peritoneum, both parietal and visceral, was very marked; the intestines were matted together in a mass in the center of the abdomen and those of you who were present will recall how closely the surface of the intestines resembled the appearance of the strawberry tongue in scarlet fever. A bright red surface with clean deep red papillæ-like projections uniformly studded all over the intestines.

Two methods of treatment are available for this condition—medical and surgical, with which you are all familiar. The question arises, which one of these methods is the most promising? If a series of cases should be collected from the literature it would not be hard to show that the medical treatment of tuberculous peritonitis is considerably better than the surgical treatment. This I think, however, can be explained by the fact that a large per cent of the cases of tuberculous peritonitis which come to operation are usually brought to our attention in the later stages of the disease when operative measures are of no avail. We must not forget, however, that the fact remains that quite a large per cent of tuberculous peritonitis patients do get well when no surgical interference is attempted.

A CASE OF FLAT PELVIS, WITH SOME INTERROGATIONS.

JOHN A. WESSINGER, M. D
ANN ARBOR, MICHIGAN.

THE subject of this report is Mrs. H., aged twenty, primipara, five feet six inches tall, weight one hundred sixty-five pounds, well nourished, and to every outward appearance a normal woman. Patient is of German parentage, born in a rural community, and has been com-

pelled to do a great deal of hard outdoor manual labor from the time she was ten years old. She was married at nineteen and became pregnant soon thereafter.

In November, 1912, she informed me of her pregnancy, expecting to reach full term at about February 1, 1913. Urinary test normal. So far her pregnancy had been without any outward symptoms. On January 1, 1913, the examining finger could just touch the sacral prominence; other measurements did not reveal anything out of normal. On January 26 this patient came to labor. After applying the test of labor for six hours and finding that she was unable to deliver herself, I called Doctor William Blair to my assistance, who also found the anteroposterior contraction, and that we had a case of flat pelvis to deal with. Believing the deformity to be relative rather than absolute, and hoping that the baby might be under- rather than oversize, we determined on a high forceps delivery under the best possible aseptic precautions. The doctor and I alternated at the forceps several times, and finally after two hours of hard work succeeded in delivering the woman of a ten pound baby. The child's head was frightfully crushed and it lived four hours. The woman's perineum was ruptured down to the rectum. This was closed immediately with interrupted chromicized catgut. Healing took place by primary union. The woman at no time developed temperature and made a prompt recovery.

Now, was this the best possible obstetrics? Perhaps it was in this particular woman. But it seems to me the case teaches something after all. The management of normal labor requires little or no knowledge of obstetrics. But how true it is that only a good knowledge of obstetrics will qualify a physician to meet successfully the difficulties that may arise from time to time in the practice of this specialty. Adequate obstetric training on the part of the student is of very recent date. We older men will all remember the cases which became our training material, namely, the women who chanced to be among our first private patients. Thanks to modern surgery, the art of obstetrics has reached a point wherein no condition contingent on gestation or parturition may occur which has no remedy. Of course, the right thing may not always be done and no man is so skilful as never to fail, but I do affirm that every woman pregnant, may reasonably expect to bring forth a living child at our hands; or rather "every woman pregnant with a viable child," as Leavitt puts it.

There is no question as pertains to methods of treatment in those marked contractions of the pelvis, such as a contraction of the true conjugate to seven centimeters. Cesarean section here is the only route. Very simple, provided one wants to deliver a live child. But those moderate degrees of pelvic contraction, those borderline cases, what about them? Cases in which the true conjugate measures nine and five-tenths centimeters. In these cases we can very easily make a mistake as to choice of methods. Here it is that obstetrics ceases to be an

exact science. It is a pretty good rule to prepare for trouble if one finds a true conjugate measuring anywhere from eight centimeters to ten centimeters inclusive. And yet every case of pregnancy complicated by a contracted pelvis even of minor degree is a law unto itself and demands its own particular study. There is no dogmatic route to the solution of the problem. Is the child large or small? Is the child's head capable of moulding? If the case is seen early can we influence the growth of the fetus in utero by methods of diet?[1] What is safest for both mother and child? That is the question. Shall we do a premature labor? Shall we do a high forceps? Shall we separate the pubic bones? Shall we deliver through the abdomen? These are the questions I am asking you; these questions involve the problems we must meet. I trust you will take them up in the discussion. Neither time nor ability were at my command to prepare you a finished paper on this all-important subject. You must be satisfied with the rough skeleton. It behooves me, however, to say a final word of God-speed to the young men, who by their zeal and effort, are bringing the subject of pelvimetry to a high plain of perfection, and by so doing are hastening the time when obstetrics will take its place among the exact sciences.

339 Washington Street East.

DISCUSSION.

DOCTOR HOWARD H. CUMMINGS: This is certainly an important subject, and I am pleased that Doctor Wessinger has presented to us the sketch of this case. In his questions he has brought up the whole problem of the treatment in borderline cases. In any obstetric problem there are two factors to be considered—the size of the passage and the size of the passenger. The methods of pelvimetry are not accurate, and much less so the methods for determining the size of the child. If we make pelvic measurements and find them to be normal we are justified in allowing the mother to have a test of labor. If, after a reasonable time, the cervix being completely dilated, the head does not progress into the birth canal, it is evident that there is a disproportion, and that some other means of delivery must be brought about. In a case of flat pelvis, where the head fails to engage in the inlet, it is a good procedure to do a version. In this way a smaller diameter of the head enters the inlet first, and delivery can often be accomplished where it would be impossible by doing a high forceps operation. Where the contraction is marked, Cesarean section is indicated, but Cesarean section is never indicated when the patient is undoubtedly septic, due to repeated vaginal examinations or unsuccessful attempts at forceps delivery. In cases of this kind version and puncture of the aftercoming head would be a safer procedure for the mother.

DOCTOR LESLIE H. S. DEWITT: Flat pelvis makes up about four-

[1] Prochownick diet.

teen per cent of all forms of contracted pelves, and is the third most common variety. Flat pelves are always interesting because of the proper line of treatment to be adopted. Doctor Cummings has well gone over the line of treatment for flat pelvis. You will recall that the normal conjugate vera measures eleven centimeters. If the measurement is nine centimeters or more with no evidence of rickets, the diagnosis is a simple flat pelvis. If the conjugate measures less than nine centimeters, the cases are rhachitic in origin. In borderline cases of flat pelvis, where the conjugate vera measures about ten centimeters and the baby is apparently normal size, version is by far better treatment than high forceps. When the conjugate measures nine centimeters or less, abdominal Cesarean section should be elected. This type of contraction is very common in Europe, and in that country it is explained by girls and young women carrying heavy burdens upon their backs, causing the promontory of the sacrum to be pushed forward. That, however, does not explain the contraction in this country. Some authorities claim that flat pelvis is an early manifestation of rickets, while others insist that simple flat nonrachitic pelves are caused by children being allowed to sit up too soon and to sit up too long at a time.

Doctor Ward F. Seeley: It has been proved by Williams in this country and by Kline in Germany that the exaggerated Sims' position gives an increase in the anteroposterior diameter of the outlet, rather than in the true conjugate as Doctor Blair suggested. Williams also found that the lithotomy position gave the same increase which amounts to from one to three centimeters. This explains the phenomenon we see after the patient has labored unsuccessfully with the head on the perineum, and when put in the lithotomy position for the low forceps operation occasionally delivers herself spontaneously. The position recommended for increasing conjugate is the Walcher position. The patient's hips are brought to the edge of the table and the thighs are allowed to hang over the edge, the table being high enough so that the toes just reach the floor. This position, of course, is a very difficult one for the patient to maintain.

We have used Parke, Davis & Company's preparation of pituitrin in a few cases. We have attempted in some cases to bring on labor with the patient at term before labor pains had set in, but were successful in only one case, the patient spontaneously delivering herself after an injection of one centimeter. We have repeated the dose in other cases at fifteen-minute intervals for three doses without any appreciable effect. The best results have been obtained in cases where the cervix has been completely dilated and in each the pains have been sufficient for spontaneous delivery. In these cases the result in several instances has been good enough to justify further trial of the preparation.

Doctor Wessinger (closing): While we were working with this patient, Doctor Blair preached this into me with much force. A week

ago I resorted to the exaggerated Sims position, and the child was born spontaneously when I did not succeed in delivering by forceps. I might add that at this time, I gave the patient one-half cubic centimeter of pituitrin. I think it may help, but I would not be surprised if someone would have a ruptured uterus by giving this drug before complete dilatation of the uterus.

A REPORT OF TWO CASES OF UREMIA.

JAMES G. VAN ZWALUWENBURG, B. S., M. D.
INSTRUCTOR IN MEDICINE IN THE UNIVERSITY OF MICHIGAN.

I AM reporting these cases principally because they so beautifully illustrate the application of the serum tests discussed before you at a recent meeting, by Doctor James Howard Agnew. Both of these patients were comatose and were left at the hospital with little or no history. The diagnosis, therefore, must of necessity rest upon the physical and laboratory findings only.

The first was a doctor from Detroit. He was apparently over seventy years, and semicomatose. He was very stupid, appeared to understand what was said to him, but made no answer. He resisted examination very strenuously at first but he soon lapsed into a passive coma. Upon examination he appeared to be a fairly well preserved old man. There was some asymmetry of the face, one brow was raised distinctly higher than the other, but this looked more like a habit than the affective palsy. There was no difference in the wrinkling, no paralysis of the extrinsic muscles of the eyes, nor was there any evidence of paresis in the lower portion of his face. His color was distinctly pale and slightly waxy. There was no cyanosis. His thorax was that of a slender old man with hyperresonance and the usual signs of senile emphysema, without râles. There was nothing unusual about his heart signs, and the examination of his abdomen was entirely negative.

After fifteen hours in the hospital it was noticed that he had passed no urine. There was no evidence of distension of the bladder but a catheter was passed and no urine obtained, although the operator was satisfied that the catheter had entered the bladder. A few drops of bloody fluid were found in the catheter when it was removed.

I first saw him the next morning. The signs had in no way changed except that his coma was deeper and he was evidently moribund. He had no temperature, his pulse rate was not abnormally high, there was very little dyspnea but he had 33,000 leukocytes.

Such cases as this are usually diagnosed uremia, although very frequently wrongly so, since there are a number of conditions which may produce a similar coma. It will be noticed that apart from the coma we had only the evidence of acute suppression to substantiate this diagnosis. The clinical textbook picture was lacking in many details. For

instance, there was no evidence of cortical irritation, either in the form of delirium, muscular twitchings or convulsions. There was no vomiting nor diarrhea, nor was there one of the many forms of dyspnea which are so numerous and frequent in this intoxication. However, uremia was about the best diagnosis that could be ventured. It will be noticed that there was no evidence of a long standing nephritis associated with hypertension; there was no enlargement of the heart, nor evidence of its insufficiency and his blood pressure was not increased. We know from experience that uremia after seventy and without cardiac symptoms is usually the result of a pyelonephritis. The ordinary chronic nephritides with high pressure are usually terminated before its victims reach the age of seventy. We might have presumed, therefore, to diagnose a pyelonephritis, probably as a result of an old cystitis or an obstruction in the lower urinary passages.

At autopsy this man showed an old chronically inflamed bladder with slight enlargement of the prostate, the left kidney was the seat of an extensive pyelonephritis, while the right kidney, besides a similar process, was more than half replaced by a large soft necrotic neoplasm, presumably hypernephroma.

* * *

The second case was brought in from Saline by his doctor. He came to us indirectly through another clinic, and we therefore obtained no history. I saw him the morning after entrance. The man was a foreigner, spoke several languages indefinitely well, but was unable to manage any of them. He was very much confused and slept a great deal of the time.

On inspection he appeared pale and pasty, with a distinct edema under the eyes and a well marked edema of the extremities. His respiration rate was very much increased, the breathing was very harsh, both on inspiration and expiration and could be heard in the hall and gave one the impression of an obstruction of the larynx. It was apparent, however, that he was getting much more air than a man would ordinarily need, nor did examination of the vascular system reveal any cause for so deep a respiration. There was evidence of considerable edema of the lungs; the breath sounds everywhere were much increased and this scarcely offered an adequate explanation of his dyspnea. The pulse rate was not increased but was irregular. The blood pressure was variously recorded between 170 and 120 millimeters of mercury. These findings of course do not have the same significance as similar findings on a regular pulse. It is the average pressure that we are interested in and this it was almost impossible to estimate. His urinary findings were interesting, showing large amounts of albumin, a number of casts and a persistent low specific gravity. His total excretion measured as high as 2300 cubic centimeters in twenty-four hours. His leukocytes ran up to 20,800 and he had a marked anemia with a hemoglobin of 27 per cent. He

had no convulsions but there was a continuous rippling of his muscles beneath the skin, marked tremor of the tongue and some unsteadiness of the eye-balls.

The phthalein test was possible here and we found no excretion of the dye in two and one-half hours. He died shortly afterwards. Autopsy was refused.

Here the diagnosis of uremia could be made with considerable confidence on the given clinical findings. However, uremia was evidently a terminal affair and the diagnosis of the primary condition offers considerable difficulty. This man showed a number of ulcers, one about the size of a dollar on his left wrist, which was deep, excavating, with a raised border and a rather narrow purplish areola; the base was covered with granulations and in the immediate vicinity there were several pin-point abscesses in the skin. There was a similar ulcer in the median line of the abdomen, just below the belt, somewhat smaller but otherwise not different. Examination of his larynx showed what appeared to be a large ulcer involving the epiglottis and the pharyngeal wall. There was also considerable edema of the false vocal cord, although scarcely enough to produce the particular type of breathing, which he exhibited. These ulcers were examined by Doctor Udo J. Wile, who leaned to the opinion that they were broken down granulomata of blastomycotic origin. Fresh preparation revealed certain bodies which might easily be mistaken for the organism of blastomycosis and a portion of the tissue was removed for pathologic examination.

Referring to literature on blastomycosis, I find that this infection shows two fairly well marked clinical forms. The first was originally reported from Europe, in a man showing subcutaneous granulomata undergoing degenerative changes and producing deep sloughing ulcers. The organism was easily found in the discharges from the ulcer and the man died of a generalized blastomycosis with metastasis in almost every organ of the body. A few years later a number of cases were reported from Chicago and its vicinity, characterized by chronic ulcer with characteristics very similar to the ones here under discussion but with a very slight tendency towards a general infection. Some eight or nine years ago reports began to come in from California, whence eighteen or more cases have been reported, which have many of the characteristics of the case first reported from Europe. The onset is usually with a rather firm tumor beneath the skin, which breaks down, producing deep ulcers and sinuses. The majority of these patients have died of a generalized infection, with an average duration of nine months.

In the light of these accounts, it seems very improbable that this case was one of generalized blastomycosis, because of the difficulty of finding the organism. In the dermatosis known as the "Chicago disease" this may be somewhat difficult, but in the type described from

California, the organisms have all been very plentiful in the tissue juices.

Both of these cases were investigated with reference to the amount of hypobromite-fragile nitrogen in the blood. As you will doubtless remember in Doctor Agnew's report, this normally does not exceed the equivalent of half a gram of urea per liter. The first case showed four and seven-tenths and the second four and three-tenths per mille. This is equivalent to nine or ten times the normal amount. As far as we know now this should suffice to establish a diagnosis of uremia. These values are the maximum up to date, that have been found in this clinic. It seems to be generally conceded that this nitrogen fraction, although it does not represent urea only, but includes probably a large number of nitrogenous bodies, is uniformly increased in nephritis and particularly in uremia. The value of its application in comatose conditions is obvious.

415 Ingalls Street North.

DISCUSSION.

DOCTOR HAROLD I. LILLIE: It would be interesting to know the otolaryngologic findings in this case as the patient was sent over to the Otology clinic first because of his labored breathing. On first examination it was noted that the patient was breathing more through his mouth than through his nose, which was very suggestive of an obstructive breathing, in fact simulating closely two previous cases of obstruction. Examination of the mouth was very difficult because by holding the tongue the difficulty in breathing became greater. The patient continually asked for water because of dryness in the throat. At one time he raised a small mass, which did not indicate anything definite. It had a foul odor. We swabbed off what appeared to be crusts covering the ulcerating area, and this left the palate clean. The same was true of the larynx. The larynx showed no obstruction. Several tracheal rings were seen. The doctor was able to give a slight history of this case. He had seen the patient three days previous to this attack, but his trouble dated from last July, at which time his legs were swollen to three times their size. It was thought to be a kidney and heart case at that time, and the patient was placed on an appropriate treatment with the result that the swelling decreased. Last October the legs again began to swell. At first syphilis was considered because of the appearance of his palate, but he has three or four healthy children, one of which was born ten days previous to his entrance to the hospital. The patient said that ten days previous to his admittance he experienced difficulty in his breathing and this has progressed rapidly. He seemed considerably improved after being put to bed. The urine showed a very great quantity of albumin, numerous casts and much pus. Considerable edema of legs and eyelids, and so he was transferred to the Medical clinic with a diagnosis of uremia.

Doctor Ira D. Loree: There is certainly a large amount of interesting pathology and medicine in the report of these two cases. It is a question whether we ever get an ascending infection from the bladder to the kidney without some obstruction to the urinary flow. Another interesting question that suggests itself to me is, "How long may a patient go with anuria?" The longest time I have been able to find on record is sixteen days. Of course this was mechanical obstruction and, unlike Doctor Van Zwaluwenburg's cases, had no suppuration. The question of injury to the ureter has also come up this evening, and as some of you may not have seen the report of Biers' work along this line I will go over it briefly. Biers found in experimenting on animals that the ureter might be tied for three weeks and still have sufficient renal function to carry on the needs of the body. In the future if time and the condition of the patient will not permit an immediate anastomosis, when the ureter has been injured by operative procedures it may be tied, and then after two or three weeks a secondary operation may be performed for its repair.

Doctor David M. Cowie: I should like to ask Doctor Van Zwaluwenburg if he considered other etiologic factors than the possible exciting causes in his second case. Was the patient associated with other patients with similar conditions, or was he associated with animals which had any skin disease?

Doctor James H. Agnew: I was particularly interested in these two cases because of the high labile nitrogen content of the blood; these being the highest encountered in a series, being run on all cases showing a diminished sulphonephthalein output. Previously the largest amount computed as urea was two and eighty-eight one-hundredths grams per litre and this case was also fatal. As Doctor Van Zwaluwenburg has said, both of these cases were diagnosed clinically as uremia, but the diagnosis was quickly established by estimating the labile nitrogen of the blood and this procedure was of special advantage in the case with anuria as the phthalin test was precluded.

With regard to the question of blastomycosis, I made blood cultures on this patient the day before death and these have so far remained sterile. However, in some blood previously drawn and received in a nonsterile vessel, mycilial threads appeared and between them many small highly refractile bodies, presumably spores. Subcultures from this on agar slants have shown no growth except a staphylococcus.

Doctor Van Zwaluwenburg (closing): Of course I understand that I have laid myself open to criticism on a number of points, largely due to omission because of the necessity for brevity. I had expected to discuss the subject rather more at length than I was able to in the given time.

With regard to the remarks of Doctor Loree as to whether or not this pyelitis was due to an ascending infection, we have no data that will allow us to draw definite conclusions. The prostate did not seem

to be sufficiently enlarged to account for such extensive secondary changes. I also wish to explain that our diagnosis of "ascending pyelonephritis" was made before the autopsy, on the very insufficient evidence of past experience.

I confess that the history brought out by Doctor Lillie had never reached me, consequently did not enter into our diagnosis. A question of syphilis was entertained. In the absence of any history, the occurrence of other cases in the immediate vicinity could not be used as bearing on the diagnosis of blastomycosis. If subsequently the pathologic diagnosis should confirm Doctor Wile's suspicion, we shall make an effort to discover whether such cases are found in that neighborhood.

NOTE.—The pathologists report a streptococcus ulcer with no evidence of blastomycosis.

TRANSACTIONS

OF THE

CLINICAL SOCIETY

OF THE

UNIVERSITY OF MICHIGAN

STATED MEETING, MAY 13, 1913.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR

REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

A REPORT OF TWO MONTHS ROUTINE VACCINATION FOR SMALLPOX OF PATIENTS IN THE UNIVERSITY OF MICHIGAN HOSPITAL.

WALTER ASAHEL HOYT, B. S., M. D.

HOUSE PHYSICIAN.

ANN ARBOR, MICHIGAN.

BECAUSE of several cases of smallpox in the city of Ann Arbor and throughout the state, it was deemed advisable on February 1, 1913, to vaccinate all persons connected with the hospital, nurses, help, and doctors, all inpatients, and all patients entering the hospital from that date on. This work was placed in my hands as house physician, and the following report is made with the hope that it may prove instructive and interesting.

At the time of this general vaccination the inpatients numbered 225, nurses 112, help 80, a total of 417. In order to do away with confusion and delay, it was deemed advisable to systematize the work and carry out the vaccination as rapidly as possible. For this reason the following system was adopted, which proved very satisfactory, and resulted in the vaccination of all of the above persons in less than three days, with practically no confusion or interruption of the routine of the hospital. The patients in each ward were assigned respectively to the intern in charge, who with the aid of one nurse was able to vaccinate his ward in a few hours.

The nurses were divided into two squads and ordered to report

on two different nights between 6:30 and 7:30 o'clock. This gave an opportunity to vaccinate the night nurses before going on duty, and the day nurses after being relieved. In this way the nurses were all vaccinated while off duty with very little resulting inconvenience. The hospital help were all vaccinated on Saturday afternoon when the work was the lightest and when many were off duty.

With the above persons vaccinated in less than three days, it was a comparatively simple matter to keep up the routine vaccination. Each patient upon presenting a green "in-card" for admission was vaccinated in my office and his card signed. No patient was admitted to the ward without this signature.

It was thought at first that there would be much confusion in carrying out the routine, and that it would be met with much opposition on the part of the patients. It was also thought that it would complicate surgical cases. The heads of the various departments were consulted as to any contraindications to vaccination of any new patient coming into his service, and the vaccination of all patients already in was left to his discretion. There seemed to be no marked objections except in cases of diffuse skin lesions, patients running marked fevers, and old people with poor resistance. These were the only patients who were not vaccinated. As to the patients themselves, we were indeed surprised at the small number who really were decidedly opposed to being vaccinated. During the two months the work was carried on, I know of only one patient who would not enter because of this reason. I will admit that many objected at first, but when it meant that they could not otherwise enter the hospital, they readily complied with the rule. The chief objections seemed to be that they knew of a case of vaccination that had proved fatal; that they had been through two epidemics without contracting the disease, or that they had been vaccinated when they were children and saw no use of further precaution. With very little tact and persuasion these objections were easily overcome.

As far as surgical complications were concerned but very few operations had to be postponed, and postoperative rises in temperature could very easily be differentiated by examination of the lesion and taking into consideration the date of vaccination. It was also thought that the fact that patients entering the hospital were being vaccinated would become known through the state and the number of patients would decrease. I have no doubt that some patients were kept away, but examination of the hospital records for February and March show that over six hundred patients registered during each month, the heaviest months during the entire year.

Asepsis was striven for both in the preparation for and the actual vaccination of the patients. The vaccination was done usually on the arm, below the border of the deltoid muscle. The arm was washed with tincture of green soap and washed off with sterile water. For the sake of experiment, the following methods of making the initial incision

were tried: (1) simple scarification of the skin; (2) simple incision with a scalpel making two straight incisions three-quarters inch long, and from one-half to three-quarters inch apart; (3) same as above with cross incisions; (4) incisions made with ivory tip; and (5) use of cotton swab on applicator.

Of all the methods used, I can really recommend but two, simple incision with the scalpel and the ivory tip. It was found in most of the cases where scarification or crossed incisions were resorted to, that secondary infections almost invariably followed. The reason for this is very evident, for when there is a large area of adjacent skin removed there is bound to be a scab formed which is easily irritated or broken, thus permitting secondary infection. However, by simple incision a very slight separation of the skin is made which after the introduction of the vaccine readily seals over with practically no crusts. After reaction sets in the vesicles appear multiple and in rows, seldom forming a confluent vesicle which is only too apt to be infected. A new method was tried in several cases with infants who are with difficulty kept quiet. This consisted in using a piece of sterile cotton on an applicator, and rubbing the superficial layer of skin until the serum appeared. While this is a very convenient method with children, and does not disturb them, it is open to the objection stated above. After vaccination, a simple dry sterile dressing was applied for a day or so until danger of infection was over. This, however, I do not consider necessary.

In two months 885 patients were vaccinated. While it would have been desirable to use the entire number for statistical purposes, it is very apparent that transient patients, because the end results of their vaccinations cannot be ascertained, cannot be utilized. Therefore, the statistics are made up from those inpatients, not including nurses and help, where the end results could be carefully noted.

Statistics at best are apt to be very unsatisfactory, and especially is this true with vaccination where so much depends on the statement of the patient as to the date of last vaccination and reaction. For this reason every patient was vaccinated regardless of past vaccination. Uniform record sheets were kept for all patients, stating age, diagnosis, date of previous vaccination, date of present vaccination, date of reaction and character, and complications.

Whether a reaction was considered successful or not depended upon the appearance of the vesicle and the date it first appeared. A reaction was considered ideal when dry papules appeared on the third day, with vesicles on the fourth with slight umbilication. At this time slight redness appeared about the vesicle and the vesicle enlarged to the seventh day, when the lesion was whitish in color on top with sloping sides surrounded by a reddish border. The reactions varied, but on the whole it was fairly easy to diagnose the successful take.

TABLE I.

Number of patients showing reactions and time elapsed since last successful vaccination.

Smallpox. Previous	Never Vaccinated.	6 mo.	1 yr.	2-4 yrs.	5-7 yrs.	7--10 yrs.	10-15 yrs.	15-30 yrs.	30--50 yrs.	50 yrs.
1	75	4	3	12	1	14	9	10	8	18

Total vaccinations followed 329
Total successful reactions .....155—44 per cent

Number of reactions successfully vaccinated within last ten years ..... 34— 22 per cent
Number of reactions not successfully vaccinated within last ten years ..... 45— 29 per cent
Number of reactions never successfully vaccinated..... 75— 49 per cent
Number of reactions previously having smallpox..... 1

155—100 per cent

TABLE II.

Total vaccinations 885
Nurses, help, and staff vaccinated 192

Total number of patients vaccinated 693
Patients never before vaccinated.....315— 45 per cent
Patients vaccinated over ten years ago.....131— 19 per cent
Patients vaccinated within ten years .....249— 36 per cent

693—100 per cent

A series of 329 cases was followed with results shown in Table I. It will be seen that of this total number there were successful reactions in 155 cases or 44 per cent. Of this number 75 or 49 per cent had never been vaccinated, 34 or 22 per cent had been vaccinated within the past ten years, and in 45 cases or 29 per cent ten years or more had elapsed since a successful vaccination. These statistics include the nurses, a great number of whom had been vaccinated two years previous during an epidemic of smallpox in this hospital. This, I think, accounts for the large number of takes between two and four years, for possibly at that time a sore arm was not differentiated from a good reaction. It will be seen that four reactions occurred in patients who had been vaccinated within the last six months. These cases were looked into carefully, and it is almost certain that two patients, at least, had had a good reaction and showed a typical scar. One patient reacted who claimed to have had smallpox fifteen years ago. This patient showed a few pits, and was from a place near Saginaw. Her case was diagnosed as smallpox at that time with some fifty other people during an epidemic. The reaction was typical.

From these statistics I think it can be concluded that immunity from vaccination lasts in the majority of cases from seven to ten years. This is further borne out by the fact that 76 per cent of the patients giving no reaction had been successfully vaccinated within the last ten years.

This I find coincides with most other reports of general vaccinations.

A second set of statistics (Table II) was made from the total number of patients admitted. This includes 693 inpatients for February and March. Of these 315 or 45 per cent had never been vaccinated. Their ages varied from one year to seventy years, 131 or 19 per cent not having been vaccinated within the last ten years. Two hundred forty-nine or 36 per cent had been vaccinated within the last ten years. This leaves 444 patients or 64 per cent who, according to our present standard of immunity, are susceptible to smallpox in case of an epidemic.

The most common complication in these cases was the so-called "sore arm" or the secondarily infected lesions. According to Schaumberg a certain amount of inflammatory reaction, the so-called areola, about a fully developed vesicle is not undesirable and probably is a part of the normal reaction. This was present in a good many cases, and was not considered a secondary infection. There were, however, about ten cases in which the swelling spread to the greater part of the arm with marked pain, tenseness, axillary enlargement, and in some cases rather severe general symptoms. This condition came on from the seventh to the eleventh day. Four of these patients gave a history of traumatism to the arm after the formation of the vesicle, and four were vaccinated with the crossed incisions. The other cases could not be accounted for other than from the vaccine itself or from faulty technic. I might say that the glycerinated vaccine with ivory points used in all this work was put out by Parke Davis & Company, and proved satisfactory. Two nurses developed the so-called vaccinal rash, or roseola vaccinosa, on the third and fifth days. This developed first on the wrists and arms and later spread to the legs. It consisted of a macular, irregular, blotchy, rose-tinted eruption, not elevated above the level of the skin. It lasted about a week and was accompanied with a slight rise in fever.

It has been claimed that there is a leukocytosis during the reaction. Daily leukocyte counts were made on two patients showing typical reactions, and in only one case was there any leukocytosis, and this showed only 12000 on the tenth day.

Perhaps one of the most interesting complications occurred in the Neurologic clinic. The patient entered the hospital February 10, 1913, and, in brief, gave the following history. The patient came complaining of headache, dizziness, and attacks of weakness. His history dates back eight months when he had frontal headache and pain in the right temple. Two weeks later he was taken with pain in the eye and had double vision. There was nausea but never any vomiting. He had attacks of sinking to the floor, but no unconsciousness. There was some clouding of consciousness and involuntary micturition. The neural as well as the physical examination was negative. The patient was vaccinated on February 11, 1913. The fundus examination showed the right eye with choked disc of two and one-half diopters, left four

diopters. Temperature on entrance was normal. On the fourth day after vaccination the patient began running a temperature of 100.4°, pulse 104, respiration 22, and had a typical vaccination on the arm. Early in the morning he had an attack of severe headache, nausea and vomiting. His head was retracted with rapid breathing. In the afternoon the patient had a similar attack, and was at this time somewhat irrational. The eye examination showed the disc swollen approximately six diopters. Neurologic examination showed some involvement of the left side of the body. The left side of the mouth and left side of the forehead were immovable. There was some twitching of the left side with tendency to catatonia. The patient had several of these attacks on this day showing convulsions and delirium. On the next day the patient was better, and on each succeeding day showed improvement of all symptoms. There was a fall of temperature to normal at the end of the ninth day after vaccination. It is also interesting to note that the condition of the discs improved, dropping back to practically that shown in the first examination. Up to the time of discharge no similar attack occurred.

The conditon, of course, may be nothing more than a coincidence, but all symptoms occur so simultaneously with that of vaccination that the latter has to be considered as a possible etiologic factor, and given consideration before vaccinating a patient with increased intracranial pressure. The condition of this patient was so serious that a decompression operation was even considered.

What conclusions, then, can be drawn from the report of these cases? First of all, it can be concluded that it is safe in case of necessity to compel a general vaccination of a community regardless of the condition of the people, with few exceptions. During the two months that a routine vaccination was carried out, a great variety of patients with all kinds of medical and surgical diseases were vaccinated with practically no harmful results or complications with the possible exception of the patient with brain tumor and increased intracranial pressure. Until more definite means of determining immunity by vaccination can be worked out, it should still be held that ten years is the upper limit of immunity by vaccination.

Finally, the series of cases just considered impresses one with the need for more uniform laws throughout the state and nation whereby vaccination may be made compulsory. We have seen that sixty-four per cent of all patients coming to the hospital from all parts of the state of Michigan should be vaccinated. This shows that our present method of carrying out vaccination is not thorough, and is, therefore, inadequate. In other words there is no supervision nor system connected with the work. How can this be remedied? The ideal system would be a free, compulsory, vaccination every ten years with vaccination of all infants between six months and one year old. This would insure an initial vaccination of all people at an age where there is the least danger to life, and the revaccination would attend to itself. This could

be placed with the State Board of Health, or in some national organization. It would put the work in the hands of men experienced in vaccination, thereby insuring uniform and accurate methods of which valuable records could be kept. Compulsory vaccination would not be an experiment, for it has been in force in Germany and England for years, and has proved remarkably successful.

Naturally such a measure would meet with much opposition, especially on the part of the laity, but when such a law was once enacted, a few years would be sufficient to overcome much of the present day prejudice against vaccination. Until that time we can only keep on as in the past urging vaccination and revaccination to the best of our ability.

DISCUSSION.

DOCTOR REUBEN PETERSON: This paper has been very interesting to me especially from the standpoint of hospital management in the presence of smallpox epidemics. At the time, it was feared that rather than be vaccinated, patients would refuse to enter the hospital. However, as Doctor Hoyt has shown, these fears proved groundless, as in only one instance did patients refuse vaccination. It brings up the question whether it would not be well to make a rule requiring every patient to be vaccinated before entering the hospital even when smallpox is not prevalent in the city and state. The same rule could be made to apply to students entering the University and to school children. Careful vaccination, which is so free from danger, would soon change people's minds regarding this preventive measure, and smallpox would soon be a disease of the past. People left to themselves soon grow careless and neglect vaccination, as shown by Doctor Hoyt's figures. The only safety lies in compulsory vaccination at all times even when there are no epidemics. In reality those actually opposed to vaccination are few in number. They make up for this by making a great deal of noise in the press and elsewhere, but as a matter of fact they have very little influence. Surely if the state has the power of quarantining patients with contagious diseases, it also has the authority to prevent them by vaccination and other means. At any rate, I think we should have the courage of our convictions and give compulsory vaccination a fair trial.

DOCTOR FREDERICK R. WALDRON: It seems to me with vaccination as well perfected as it is, that we might ask the question, Why should the rest of us be made to care for those people who contract smallpox? It seems too bad to have such care and expense as we are put to in epidemics of smallpox. I agree with Doctor Peterson that the University Hospital should put itself on record and require vaccination for entrance. I have differed from Doctor Hoyt's findings in vaccination, and have found that a great many people are protected for a number of years. In many families where parents and unvaccinated children have been vaccinated, the children will all show typical takes and the parents, some of them with histories of the last successful

vaccination as long as thirty or forty years before, will show no reactions at all. I do think that children ought to be vaccinated young, since the scar is very much less and the effects of vaccination are very much milder. I also think that the simple incision method is very much the best. It seems as though this method is the most surgical and, therefore, the method of choice. There is so little pain from the incision itself that a small child does not know when you are doing it. The child that is not old enough to be afraid is much more easily vaccinated than a child over eight or ten. You can divert small children and keep them quiet.

DOCTOR JAMES F. BREAKEY: I think Doctor Hoyt's paper is most interesting and very timely. One who has not had experience in meeting with the public at large, at times of epidemics, has no idea of the number of people who have not been vaccinated. That holds good, not only among the working class, as it did during the recent epidemic, and the poorer people, where practically none of them had ever been vaccinated, but it holds true also among the students, and it is not unusual to find doctors' families where vaccination has not been carried out. The suggestion of Doctor Hoyt of the adoption of compulsory vaccination by the state or federal government, is not new, and will sometime come to be true. Such publications as *Life* do much harm by taking a stand against vaccination; seeking out cases where some secondary infection has been followed by bad results and we cannot deny that sometimes vaccination has had bad results. The only thing is to impress the people that the good results of vaccination so much overrun the bad results of smallpox that vaccination ought to be universal.

DOCTOR MARK MARSHALL: I have vaccinated myself every year, and have found the condition which the doctor mentioned. The first time it took, and since then there is only a slight induration along the incision. I have wondered whether it was a minor take or whether the serum injected was not inoculated with smallpox virus.

DOCTOR WILLIAM BENEDICT: In regard to that case to which Doctor Hoyt refers, it came to our clinic from the Neural clinic with a tentative diagnosis of brain tumor. When this man first came in, he had a swelling of the nerve heads of two and one-half to four diopters, and a few days after entrance this went up to four and five diopters. This, however, did not show any inflammatory change but was of a type which we find in brain tumor. That the swelling of the nerve head went down so rapidly can be accounted for in that the man had a lumbar puncture and a loss of twenty-five cubic centimeters of spinal fluid.

There is a difference between a choked disc from brain tumor and inflammatory papillitis. A high swelling of the nerve head may come up to five, six or eight diopters in inflammatory papillitis, but the difference in appearance and color, and the amount of exudate which

was left after the swelling had receded showed that in this case the swelling was due to pressure rather than an inflammatory change following this vaccine reaction.

Doctor Walter Hoyt (closing): I have looked up the literature on the subject of accidents in vaccination, and have been unable to find any report of a case with increased intracranial pressure, which had been vaccinated with bad results. Doctor Camp, at the time, I believe, felt that the change in the patient's condition was due to the vaccination, and for this reason thought that a decompression operation should be done.

Another interesting fact is that over sixty-four per cent of all new patients entering the University Hospital are outside the limits of immunity for smallpox. Doctor George Dock, in his article in "Osler's System of Medicine," gives statistics extending over four years, in which he shows that sixty per cent of all patients coming to the University Hospital during that time, should be vaccinated. This coincides with my statistics.

A STUDY OF CONGENITAL DISLOCATION OF THE HIP WITH REPORT OF SIX CASES.

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The condition designated as congenital dislocation of the hip has been known since ancient times. Hippocrates recognized this deformity and considered it curable. As early as 1838, Pravacz, by means of extension, was able to reduce a congenital dislocation of the hip, but could not devise a method of fixation and a recurrence of the deformity followed.

To Paci, Hoffa and Lorenz is due the credit for the present status of treatment. Hoffa conceived the idea of enlarging the acetabulum through an open incision and replacing the head; Lorenz so modified and improved this method as to make it much less dangerous to life; Paci, in 1888, seeing the high mortality and bad functional results, which so frequently followed the bloody reductions of Hoffa and Lorenz, succeeded in reduction by manipulation and here began the so-called bloodless method, popularized by Lorenz in this country at the time of his visit in 1902.

A brief review of the present day etiologic theories might be of interest. These resolve themselves under two separate heads: First, some anomaly in development in the femur or pelvis; second, intrauterine pressure.

In favor of the first theory is the fact that a hereditary factor exists through both male and female and can be traced to the collateral branches of the affected family. The acetabulum in early fetal life is a shallow depression, which may, from some injury or malformation

in its growth center, fail to develop. It is quite possible that the head of the femur has never been in the acetabulum and therefore the condition is not a dislocation, but a misplacement of growth centers.

The mechanical intrauterine theory presents a much more logical and attractive field for investigation and is far better suited to the ordinary mind.

Any intrauterine position maintained for too long a time will lead to a definite malformation. Can we find any intrauterine position, long maintained, which is likely to produce a dislocation? The maximum of joint surface in contact is found in the extension-abduction position. The minimum in flexion-adduction. This means that a large portion of the posterior superior articular surface of the femoral head is outside of the acetabulum in flexion-adduction of the limb. This is the normal position for the limbs of the child in utero and is one of the most constant and prolonged of fetal positions.

You have all noticed with what degree of difficulty the lower limbs of a newly born child are extended and for how long a time the flexion-adduction position is maintained. This can mean but one thing—the position of flexion and adduction has been so long and persistently maintained in utero that there has been set up a form of spastic contraction of the flexors and adductors of the thigh. Any shortening of the flexors and adductors produces a corresponding amount of stretching to the posterior capsule of the joint and the posterior group of muscles. The head of the femur in this position tends to stretch the posterior capsule and favor a dislocation over the posterior rim of the acetabulum. Add to this long maintained position, a large fetus, a small, hard uterus or lack of amniotic fluid and we have sufficient cause for congenital dislocation at the hip. Here it might be interesting to explain why this condition is six times more prevalent in the female than in the male. The female pelvis, due to its peculiar shape, has its acetabulum placed farther laterally and posteriorly, thus giving less stability in maintaining the head in its socket in the flexion-adduction position of fetal life. The etiology then may be summarized as follows: there is some developmental anomaly of the acetabulum which fails to give the usual amount of stability to the joint and the intrauterine position long maintained produces a dislocation which becomes progressively more marked as the age of the child increases.

During the year 1911-1912 we have treated six of these cases by the manipulation method with varying degrees of success. Some of the advocated methods of reduction we have found of value and others have shown themselves to be not only bad surgery, but dangerous in their application. The ratio of female to male cases has been four to two, with the females more difficult to reduce and maintain in position. The ages have ranged from two to ten with an average of six and one-third years for the series. The reduction in cases with two or more inches of shortening and well developed muscles has been difficult and in some cases we have found several attempts necessary before satis-

factory results were obtained. Adductor tenotomy has been done but once and even this was hardly necessary. The weakened anterior protection given by the adductors later gave rise to an anterior transposition and marked decrease in the power of adduction and inward rotation. This condition prolonged the treatment and led to the decision that adductor tenotomy should be resorted to only as a last resort, when possible, relying upon long maintained stretching of these muscles. One bad result, with the patient still under treatment and slowly gaining is one of sciatic neuritis from stretching or pressure from the padded block which was used in this case as a fulcrum. Previous cases have given an equal amount of difficulty in reduction where the padded wedge was not used and at present the latter is not in good repute in this work and has been discarded for a fulcrum of less unyielding material. The time required for reduction has ranged from one to two and one-half hours.

CASE I.—Female, aged ten years. No history of any deformity in other members of family. At birth patient weighed nine pounds and mother states that both lower limbs were flexed tightly to the body. As a baby she did not want to be handled. When she began to creep, her parents noticed a dragging of the right leg and foot. She began walking at two years of age and was lame from the very beginning.

December 9, 1912, she was examined at the University Hospital. Her right leg was found three inches shorter than the left, there was a slight amount of atrophy and some lumbar scoliolordosis. Great trochanter very prominent on the right. Abduction limited. Trendelenberg sign positive. The *x*-ray shows posterior superior dislocation of right hip, acetabulum present and shows fairly good ossification of posterior superior lip. No coxa vera. Head of bone small, but well developed.

December 12, 1912, under ether anesthetic, according to the method of Lorenz, the structures about the joint were stretched and the head of the bone forced downward and forward until it was thought a reduction had been obtained. The *x*-ray examination, however, showed the head below and slightly behind the acetabulum. As the patient had been under ether for over two hours a plaster dressing was applied with limb in abduction and flexion and the patient put to bed. Block was used as a fulcrum.

December 15 patient developed a marked sciatic pressure neuritis with severe pain in limb.

January 25 a second attempt was made and after thirty minutes manipulation the head of the bone was found by *x*-ray examination to be in the acetabulum. Right foot is swollen and edematous. Limb very painful. New plaster dressing applied as before.

March 10: Dressing removed. Reduction still perfect. Very little motion of foot. Marked edema. New dressing applied and limb extended somewhat.

May 3: Dressing removed. No pressure sores. Foot swollen.

Sensation perfect. Very little power of motion in flexors and extensors or foot. New dressing applied.

This case is still under treatment.

CASE II.—Male, aged two years. No history of deformity in family. Patient was a late walker, being nearly eighteen months of age before he could stand alone. Three months before coming to University Hospital, mother noticed that patient favored left leg in walking. Entered the hospital April 20, 1911, at which time examination showed left leg one inch shorter than right, with limited abduction and outward rotation. Head of bone could be palpated above Nelaton's line. Trendelenberg sign was positive and there was present a small amount of atrophy of left thigh.

May 13, 1911, under ether anesthetic, the dislocation was reduced according to the method advocated by Lorenz. The adductors were easily broken down and the head replaced in the acetabulum. No click or jar was noticed during reduction. The limb was put up in the flexion and abduction position. An *x*-ray plate taken through the dressing showed a perfect reduction. The first dressing was changed two months later and this treatment kept up for one year at which time the limbs were of equal length and walking apparently normal, except for a slight tendency to favor the affected limb, due undoubtedly to the atrophy incident to the long treatment with fixation dressings.

CASE III.—Female, aged five years. Father is addicted to the use of alcohol. Mother living and being treated for morphin habit. It was noticed while still creeping that child favored the right limb. When she began to walk, which was not until nearly two years of age, the patient would drag right foot and it was some three months later before she could flex the limb on the body in walking. Patient entered University Hospital August 1, 1911, at which time examination showed a marked lumbar lordosis, prominent right hip, one and one-half inches shortening, no pain, slight amount of atrophy, positive Trendelenberg sign, with limited flexion, abduction and outward rotation. An *x*-ray examination showed a posterior dislocation of the right femoral head. The acetabulum outline was not definite, showing no ossification of its posterior superior rim.

September 5, 1911, patient was anesthetized, the adductors and hamstring tendons stretched and a reduction secured in one hour. The limb was put up in the usual position of flexion and abduction. A definite click and jarring sensation was obtained in the reduction of this case. Treatment continued for ten months at which time patient was walking with the assistance of crutches. There was one-half inch shortening and reduction was perfect, with nearly the normal range of movements. Patient has reported since a perfect result.

CASE IV.—Female, aged seven years. Family history negative. Began to walk at two years of age. Parents noticed at that time that patient had trouble with right limb, but thought nothing of it for several years when this condition increased to a marked lameness and

peculiar forward swing of the limb in walking. At the age of five years a spinal curvature appeared which led parents to consult an osteopath, who adjusted the matter satisfactorily. No further attempt was made to treat the condition until patient entered University Hospital in July, 1912. Examination at that time showed a marked lumbar lordosis, associated with a right lateral curve, which could be corrected by the proper amount of elevation under right shoe. There was one and three-quarter inch shortening, marked adductor contraction, with limited abduction. Trendelenberg sign was positive.

August 19, 1912, patient was anesthetized and the right hip replaced with some difficulty. It was thought necessary to cut the contracted adductor tendons to allow the thigh to assume a position of abduction. No sensation of slipping was experienced in this reduction. The padded block was not used. The limb was put up in the usual position. The dressing was changed during the seventh week after operation. There was a definite depression in the groin caused by the failure of reunion of the adductors. The limb was gradually brought down and rotated inward at each dressing and at ten months patient was walking. An *x*-ray at this time showed an anterior transposition of the femoral head. The adductor tendons still afforded poor anterior protection to the joint, allowing an eversion deformity of the whole lower extremity There was, however, no shortening and the result was very satisfactory to the parents.

CASE V.—Male, aged nine years. Mother has a deformity of pelvis, the nature of which was not ascertained. There are two other healthy children and a history of three miscarriages. Patient weighed nine pounds at birth and no trouble was suspected until he began to walk, when parents noticed a slight limp in the left limb. Patient tires easily and does not care to walk much. He entered University Hospital January 13, 1913. Examination showed prominent left hip, two inches shortening, limited motion, positive Trendelenberg sign, absence of pain. There is also a marked left lateral lordosis. Patient is poorly developed. Weighs only fifty pounds.

January 19, 1913, under ether the head of the femur was reduced, with difficulty, in one hour and twenty minutes. The corrective position was maintained with plaster. An *x*-ray examination the following day showed perfect reduction.

May 1, 1913: New dressing applied and limb straightened slightly. This case is still under treatment.

CASE VI.—Female, aged five years. Family history negative. Patient began to walk at the age of two years and has been lame since. She entered University Hospital January 4, 1913. Examination at that time showed small amount of lordosis, one inch shortening, no atrophy, no pain, positive Trendelenberg sign, prominent hip and palpable head above Nelaton's line, with limited movements. January 5, 1913, reduction was made under ether, with little difficulty and the

position maintained with plaster. This dressing was changed two months later and the patient sent home and has not yet returned. An *x*-ray examination shows a perfect reduction and a perfect result is expected.

The following table gives a brief summary of the case findings and the final results as far as it is possible to state. It will be seen that three cases are still under treatment, two of which we hope to report later as perfect cures.

Case Number.	Sex.	Age.	Initial shortening.	Spinal Deformity.	Right or Left Hip.	No. attempts at reduction.	Adductor tenotomy.	Padded Wedge.	Click or Jar on reduction.	Complications.	Final shortening.	Time of treatment.	Perfect results	Improved result.	Anterior transposition.
			inches.												
1	F.	10	3	Lordosis.	R.	2	—	+	—	Sciatic Neuritis.	Still under treatment.				
2	M.	2	1	None.	L.	1	—	—	—	—	None.	1 yr.	+		
3	F.	5	1½	Lordosis.	R.	1	—	—	+	—	½ in.	10 Mo.	+		
4	F.	7	1¾	Scolio-Lordosis.	R.	1	+	—	—	Eversion Deformity.	None.	10 Mo.	—	+	+
5	M.	9	2	Scolio-Lordosis.	L.	1	—	—	—		Still under treatment.				
6	F.	5	1	Lordosis.	L.	1	—	—	—		Still under treatment.				

CONCLUSIONS.

(1) Adductor tenotomy weakens the anterior support to hip-joint favoring an anterior transposition of the femoral head and should be resorted to rarely.

(2) Koenig's padded wedge as a fulcrum is a dangerous instrument favoring fracture of the femur, pressure paralysis of the sciatic nerve and bruising of the soft parts and should never be used.

(3) Pounding the adductor muscles loose from the pelvis with the fist or edge of hand favors anterior crural paralysis, fracture of the pelvis, and breaking of the skin, which may lead to deep sloughs and destruction of a large area. This method should be discarded.

(4) Well developed children over six years of age, with two or

more inches of shortening should have several weeks of extension treatment before attempting reduction.

(5) Reductions should not be undertaken in children under three years of age because of the difficulty encountered in keeping them clean and the greater dangers of injury to the delicate structures in and about the hip-joint.

(6) Reduction by manipulation in cases over ten years of age, with well developed muscles and more than two inches shortening should not be undertaken and is attended with greater danger than the open operation.

722 Whaley Court.

DISCUSSION.

DOCTOR CYRENUS G. DARLING: I think that this is the first report of such cases we have had from the University of Michigan hospital. There were very few reports on treated congenital dislocation of the hip in this country until Lorenz came over with his so-called bloodless method, then the surgeons of this country became interested and used, not only Lorenz' method, but devised various other methods for carrying out the same work. Experience in this clinic has shown that some of the methods may be good in the hands of those who have perfected them, but may not prove equally successful in the hands of others. Results are more successful after an operator has, by deduction and study, devised a method of his own. When the bad points in the treatment have been eliminated and new ideas have been perfected the doctor will be able to present more favorable results.

DOCTOR CHARLES L. WASHBURNE (closing): It is quite evident that the present statistics of the treatment of dislocation of the hip has been derived from various methods. There are very few doctors in this country today who employ the methods which Lorenz did in 1902. Treatment which is successful in Vienna is not particularly successful in the United States of America. The patients there are regarded as inanimate objects and are treated as such. In this country we have to take into consideration what people are likely to say about us after the patients have been treated. There have been a number of methods advocated in this country, namely, by Ridlon, of Chicago, Bradford, of Boston, and Taylor of Philadelphia. These I consider far superior to any method that Lorenz ever advocated.

REPORTS OF CASES.

A REPORT OF A CASE OF TUBERCULOUS OPHTHALMIA.

DENNIS VINCENT SMITH, M. D.
Department of Ophthalmology.

I WISH to report a case of tuberculous ophthalmia which is interesting both from a diagnostic and therapeutic standpoint.

Mr. G., aged thirty-four, came to the University Hospital January 3, 1913, because of redness and soreness in the left eye. The family

history is interesting in that his father died of pneumonia and a paternal uncle and aunt and two paternal cousins died of consumption. Inquiry into his personal medical history showed that there had been an enlarged gland on the left side of his neck ever since young manhood. This was removed nine years ago and pronounced tuberculous. Following the removal, smaller glands appeared in the lower lip and farther down the neck. These had not grown larger nor had they given him any trouble. There had been no night sweats, cough, nor a loss of weight. During the past year there had been some stomach trouble, evidently hyperacidity.

His eye trouble had been present off and on for three years. He first noticed a redness of the left eye between the limbus and the outer canthus. There soon developed a swelling in this region which looked like a small "boil," but did not break nor discharge. The swelling lasted about two weeks and in going away left a grayish-brown stain. The first swelling was soon followed by a similar one on the medial side of the left eye. There followed other attacks of similar nature except that each seemed to increase in severity till the whole eyeball was reddened and inflamed. The swelling always appeared in a new place and the attacks seemed to be worse during the months of November and December each succeeding year. There was only a slight soreness in the eyeball and no discharge. The appearance of the eye and the intolerance of light were the greatest annoyances. The photophobia was almost constant so that even in the occasional intervals between attacks he could not read. About a year ago an ulcer appeared in the centre of the cornea causing pain and some discharge. The eye had been treated locally with collyria and ointments without much success, while mercury and the iodides had been taken internally.

When the patient entered the hospital his eye had been sore for over two weeks and he complained of photophobia, lachrymation and some tenderness. Vision in oculus dextra was 5/20 and in oculus sinistra was only light perception. Tension—oculus dextra normal, oculus sinistra, 2. The external appearance of the right eye was normal. There was a slight mucoid discharge in the left eye. The palpebral conjunctiva was slightly congested. The ocular conjunctiva was markedly congested being purplish-red about the limbus, fading at the fornix. In the conjunctiva between 9 and 10 o'clock and three millimeters back from the limbus was a small opalescent vesicle about one millimeter in size. The sclera showed both superficial and deep injection. The limbus was vascular and there was a central corneal nebula with active ulceration at the center. The whole cornea was wrinkled and showed vascularity. The iris appeared normal and the pupil was active. A few days after entering the hospital a sago-like body with a granular appearance was noticed in the conjunctiva opposite 2 o'clock.

A diagnosis of tuberculous conjunctivitis was made upon the history of recurring attacks of redness and swelling without pain, and upon the sago-like bodies in the conjunctiva. The von Pirquet test was

positive, while examination of the lungs was negative. The Wassermann test, blood and urinary examinations were negative. Inspection of the throat showed a tuberculous involvement of the epiglottis and larynx. This was treated with daily applications of ten per cent formalin with marked improvement. During his stay in the hospital two new nodules appeared in the conjunctiva. One was excised and examination in the Pathologic laboratory showed it to be a tubercle with slight tendency to caseate. The other was curetted and the contents examined for tubercle bacilli but none were found.

The eye was treated locally with zinc and atropin and iodoform was used till the corneal ulceration disappeared. Aspirin was also given for about the first four weeks. The patient was at once put upon injections of old tuberculin beginning with one four-hundredth milligram. The injections were made about four to six days apart and the dosage was gradually increased so that after two months he received one-third milligram. The dosage was reduced to one-twentieth milligram and again gradually increased to one-fifth milligram. A two-hour temperature was kept after each injection and only once was there a well defined focal or general reaction. Following the injection of one-twentieth milligram there was a slight contraction of the pupil and an increase in the ciliary and conjunctival injection while the temperature reached 100°.

Almost from the first the eye began to improve and with the exception of the two nodules before mentioned, the recovery was rapid and uneventful. The tension returned to normal and the vision improved so that after his three months stay in the hospital his vision in oculus dextra was 5/5 and in oculus sinistra was 5/20. The redness and photophobia disappeared early and the enlarged cervical glands diminished in size. As the redness left the eye, faint brownish stains could be seen in the conjunctiva at varying distances from the limbus and irregularly grouped about it, these being the remains of previously active tubercles. The patient was discharged with the understanding that his local physician would continue the injections for several months.

In view of the well established diagnosis of tuberculous ophthalmia and the ineffectual previous treatment, the evidence here points directly to the value of the tuberculin injections in this class of cases.

DISCUSSION.

DOCTOR WALTER R. PARKER: This case presents a typical tubercular infection of the conjunctiva and corneoscleral juncture. But one finding is lacking to make the report complete, namely, the demonstration of the tubercle bacilli in the section excised. Unfortunately we are rarely able to find them, although they have been found.

Tuberculosis of the eye is a rare disease. The conjunctiva, choroid, ciliary body, and iris being the most usual structures attacked. Tubercle bacilli carried by the blood are most likely to be arrested in places

where the anastomosis of the blood-vessels occur or where the capillary plexes are finest. In the iris the infection will occur near the pupillary border or at the base (at the site of the lesser or greater circle); in the ciliary body in the plexus of the ciliary processes between the epithelial covering and the ciliary muscle; in the choroid in the capillary plexus forming the inner layer. The infection may take place near the disc in the area of anastomosis between the vessels of the papilla and the choroid. Primary infection of the retina almost never occurs although it may be involved as a secondary process. Infection of the sclera usually is an extension from the suprachoroidal lymph space. From the sclera it extends to the cornea leading to the condition described by Fuchs as sclerosing keratitis.

Infection of the conjunctiva or cornea alone is ectogenous.

While the clinical appearance of tuberculosis of the eye is suggestive,, the "tubercular test" must be made in all cases, the injection test being the most important. That these patients rarely complain of pain and tubercular infection elsewhere (as in the case reported) is the exception rather than the rule.

The method of treatment as outlined by Doctor Smith is the one I use in all these cases, and the results are surprisingly good.

Doctor R. Bishop Canfield: I cannot discuss the ophthalmologic part of this paper, but I am interested in the throat condition. I understood Doctor Smith to say that the tubercles appeared in the larynx. This patient had a tubercular laryngitis, which is always secondary to tuberculosis elsewhere in the body. As Doctor Parker stated, the tuberculosis of the eye is related to the lymphatic system. It seems quite probable that this was secondary to tuberculosis elsewhere.

Doctor Dennis V. Smith (closing): It is perhaps interesting that just at this time there were several cases of episcleritis in the clinic. Because of the intense episcleral injection, this case might easily have been confused with those of true episcleritis, but here the injection was not limited to one quadrant or part of the eye as is so often true in episcleritis. Furthermore, the history of recurring attacks without much pain is quite different from episcleritis, particularly of rheumatic origin, in which there would be intense and persistent pain.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, JUNE 4, 1913.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR.
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

A STUDY OF THE EYE GROUNDS IN PSYCHOSES.

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A STUDY of the ocular conditions of psychopathic individuals has revealed a relationship existing between the psychosis and certain changes in the eye. The knowledge of such relationship serves as a valuable aid to both the psychiatrist and the ophthalmologist in diagnosis and prognosis of many brain lesions.

The pupillary phenomena are described at great length in encephalomyelopathy, in some instances being of almost pathognomonic significance. Certain disturbances of motility of the eye with or without associated disturbance of accommodation are regarded as strongly indicative of central lesions, while interruption of sensory and motor reflex arcs often supply evidence for location of the lesion.

Certain observers have described changes in the ophthalmoscopic appearance of the eye occurring in given psychic conditions, but with the exception of well defined changes found in a few psychic states due to some organic brain disease, these observations have not been sufficiently confirmed to make them of special diagnostic value.

Considering the optic nerves as commissures of the brain we would expect to find more constant and more definite eye changes in psychoses due to extensive pathologic changes in the brain than in the functional psychoses, and this has been found to be so. Arteriosclerosis and high vascular tension are often accompanied by visible changes in the retinal vessels such as corkscrew appearance of arterial twigs, arterio-

venous compression with or without distal venous dilatation, dull red congestion or arterial edema of the optic disc, and marked perivasculitis and hemorrhages.

These changes are particularly important because they form a frequent and early sign of general arteriosclerosis, especially of the brain and kidney.

Chronic meningitis and hydrocephalus together with tubercles of the brain are quite often the cause of an optic neuritis and an ophthalmoscopic examination may reveal the early stages of the disease.

Bull states that about thirty per cent of all syphilitics suffer from hyperemia of the optic nerve in all stages from almost normal quantity of blood in the arteries to a marked choked disc, particularly those who complain of headache.

In tumors of the brain optic neuritis is said to occur in from seventy per cent to ninety per cent of all cases, thus forming one of their most important symptoms. "This symptom," says Fuchs, "is the more deserving of consideration inasmuch as a cerebral tumor may often run its course for a long time without producing any other positive symptom." "Accordingly, in every case in which there is a suspicion of the existence of a cerebral affection, the fundus of the eye should be examined with the ophthalmoscope."

It is in cases of psychoses without definite pathologic cerebral changes that the most discriminating examination must be made and the greatest amount of judgment exercised in pronouncing a diagnosis. Here the changes are usually slight if found at all, and comprise changes in the nerve head and retina.

We recognize three groups of pathologic coloring of the papilla given by Wilbrand and Saenger as follows:

(1) A pigmentation of the optic discs.

(2) An increase in amount of blood in the vessels, and increased redness of the papilla.

(3) A decrease in the quantity of blood in the vessels, a marked pallor of the papilla.

It is with the second group that we are more concerned in these cases as most of the changes described in certain classes of psychoses are of segmental increased redness of the papilla.

An increased injection of the papilla may be congenital or acquired. This, however, is in most cases accompanied by a prominence of the optic disc, and if acquired is due almost exclusively to inflammatory processes. The color of the normal papilla is determined by the translucent condition of the lamina cribrosa in the transverse section of the medullated optic nerve and by the filling up of the capillaries and small vessels of the papilla tissue which is almost completely transparent. In ordinary lamp light the optic nerve appears of a whitish color mingled with red, the latter due to the large numbers of capillaries in the optic disc. In the medial half this reddish color tone is more marked than on the temporal side, because the mass of nerve fibers which pass

across the edge of the papilla in the direction of the macula is less.

The appearance of the reddish color tone is very different in different individuals because of the difference in the comparative amount of pigment in the choroid, the actual or apparent size of the disc due to variations in the size of the eyeball or to changes in refraction, and because of the greater transparency of the tissue in youth where the papilla is more red than in older people where it appears more of a gray.

We distinguish then:

(1) Simple hyperemia.

(2) Hyperemia with edema of the papilla.

The latter we further divide into two groups:

(1) Simple neuritis, neuroretinitis.

(2) Choked optic disc.

In speaking of simple hyperemia, it is evident that it cannot be diagnosed as pathologic unless it developes while the patient is under the eyes of the observer, as a simple hyperemia of the papilla in itself takes its course without disturbing the functions.

In inflammations of the papilla we distinguish in the ophthalmoscopic picture:

(1) Neuroretinitis.

(2) A choked optic disc (with extensive edema of the papilla).

(3) A simple neuritis optica (without extensive edema of the papilla).

The ophthalmoscopic picture of an inflammation of the papilla only shows that there exists a more or less intensive hyperemia, edema and streaks of the papilla, not that the inflammation extends back into the optic nerve trunk. Here again the picture is often confusing and a papillitis may be mistaken for an habitual condition—the so-called pseudoneuritis, which is often observed in extreme hypermetropia. In pseudoneuritis there is such a congenital thickening of the supporting tissue between the nerve fibers that the papilla becomes very prominent, has a turbulent, reddish appearance, with its boundaries covered with radiating streaks. The height of the papilla may reach ten diopters. Fine floating opacities in the vitreous will also give to the nerve head, and to a less extent the whole fundus, an appearance of increased redness.

Differential diagnosis of the condition of the eye ground is thus seen to be complicated when upon an habitual condition we have imposed changes commonly found in cerebral affections of organic pathologic or toxic etiology. In order to carry this out we must bear in mind the possibilities of simulated pathologic conditions and eliminate so far as possible all sources of error by making the examinations under the best circumstances. We must take into consideration any external condition or disease of the eyeball itself or the adnexa, the condition of the refraction media, gross errors of refraction, the size and shape of the pupil the comparative size and shape of the disc, the

relation of the arteries and veins, the natural pigment of the fundus, compared with the complexion of the individual, associated, independent general disease, and finally the acuity of vision.

Comparative readings for color discrimination should always be made with the same kind of light as the red of a fundus appears darker when viewed by a gas light than when illuminated by electricity.

	No. Cases.	Normal fundus.	Papillitis.	Retinitis.	Low grade neuroretinitis.	Hyalitis.	Arterio-sclerosis.	Central choroiditis.	Disseminated and Diffuse choroiditis.	Wassermann blood positive.	Wassermann cerebrospinal fluid positive.
Alcoholism ...	7	3	1	2		1				2	
Del. Tremens.	1	1									
Toxic. Del....	3	1	2								
Morphinism ..	2	2									
Cerebral Syph.	5	1	1		2			1	1	5	2
Gen. Paralysis	8	5		2	2			1		8	8
Art. sclerosis...	8	1			2		4	2			
Brain Tumor.	1		1	1							
Imbecile	1	1									
Epilepsy	4	3			1						
Dem. Praecox Paranoid....	5	4	1		1						
Dem. Praecox Heb.	10	7	2	1							
Par. Cond....	4	1	1	2	1						
Man. Dep. Mix.	5	4			1						
Man. Dep. Man.	6	3	1	1	1					1	
Man. Dep. Dep.	20	6	2	2	3	3	3	2	1		
Presenile Psy.	2	1					1		1		
Hysteria	7	7									
Psycho. Person	5	3		1					1		
Psychoneurosis	1						1				
Psychasthenia	2	1		1							

In the study of the eye grounds in over a hundred unselected cases of psychoses I have made a comparative table of the conditions found. These patients were all from the Psychopathic Hospital in varying stages of the psychoses and examined under the same environment. With the exception of a few cases which were examined at the bedside with an electric ophthalmoscope they were all examined in a dark room by a gas light from an Argand burner and with a Loring ophthalmoscope fitted with a concave mirror. All observations were made by the direct method, the patient's pupils in every case having been previously dilated.

On the basis of whether there was an organic condition responsible for the mental disorder of the patient these cases have been divided into four groups.

(1) Psychoses due to or accompanied by organic brain diseases.
(2) Imbeciles and epileptics.
(3) Dementia praecox.
(4) Functional psychoses.

From this table it may be seen that of thirty-five cases belonging to the first group a diagnosis of normal fundus was returned in fourteen or forty per cent.

Out of five cases belonging to the second group a normal fundus was found in four or eighty per cent.

In the group of dementia praecox cases eleven out of fifteen or seventy-three and three-tenths per cent presented no abnormal fundus changes.

In the last group of fifty-two cases a diagnosis of normal fundus was returned in twenty-six or fifty per cent.

It is notable that in the first group of cases eight were cases of general paralysis, five of whom showed no changes in the fundus, while only two others showed a neuroretinitis. One other with retinal hyperemia showed evidence of old cyclitis and decemititis.

A positive Wassermann reaction was obtained on both the blood and cerebrospinal fluid in all of the cases of general paresis, while of the cases of cerebral syphilis the Wassermann reaction was positive on blood in all cases, on cerebrospinal fluid in two.

It is interesting to note here in passing that out of the eight cases of paresis three retained normal pupillary reactions to light, while there was only one case of myosis, two of mydriasis, and two with Argyl Robertson pupils.

Out of eight cases of psychosis due to cerebral arteriosclerosis four showed well marked retinal arteriosclerosis, two a low grade of neuroretinitis and two a central choroiditis.

The questionable nature of the etiology of dementia praecox makes this group in itself an interesting one.

Blin, in 1905, attempted to show that the retinal changes are analogous to those seen in the various acute and chronic infections on the basis that dementia praecox was an autoinfectious disease. Of eighty-seven cases some abnormality of the papilla was found in fifty-nine. Among the abnormal conditions found were: a—constant hyperemia of the discs; b—transitory congestion; c—constant anemia; d—intermittent anemia; e—congestion alternating with anemia.

Tyson and Clark examined one hundred and nine cases of dementia praecox with the ophthalmoscope and report abnormality of the papilla in all cases under study, as follows:

Low grade perineuritis.....	Oculus Dextra 62	Oculus Sinistra 67
Temporal pallor, nasal cong..	Oculus Dextra 10	Oculus Sinistra 11
Pallor of discs	Oculus Dextra 37	Oculus Sinistra 31
	109	109

Quoting from Tyson and Clark (*Journal of the American Medical Association*, May 2, 1908, page 1415): "The fundus changes as seen clinically may be divided into three groups which are usually in the order of their occurrence as follows:

"(1) Congestion of discs; hyperemia and edema; dilated, dark

colored veins; slightly contracted arteries, and blurring of the edges of the discs, all varying in degree. These changes constitute a low grade of perineuritis of the optic nerve.

"(2) Congestion of the nasal side with temporal pallor of discs; dilated veins, contracted arteries.

"(3) Pallor of discs, dilated veins, contracted arteries. These changes constitute anemia and partial atrophy of the optic nerve."

They assert that "the disc changes in dementia praecox have some resemblance to those seen in the toxic amblyopias of tobacco and alcohol."....."The primary departure from the normal in the discs is in the veins. They become dilated, tortuous and darker than normal. Edema of the disc appears shortly afterward. These changes are analogous to the passive congestion seen in the face and hands in dementia praecox cases."

I have been unable to find other observers who have reported papillary changes in one hundred per cent of their cases. Most of the cases of dementia praecox in this series were in the early stages of the disease and showed no abnormality of the fundus.

One case of paranoid condition deserves special mention because of the autopsy findings. Case number 2762, male, aged forty-eight, pharmacist, was examined November 13, 1912. Vision: Oculus dextra, 5/5; oculus sinistra, 5/4. Pupils small, regular, equal, reacted to direct and consensual light stimulation, and in accommodation, but very sluggishly.

Ophthalmoscopic examination revealed discs round, margins slightly veiled nasally, shallow physiologic cup, lamina cribrosa barely visible. The foveal reflex was not present, the macular region being darkly granular. There was a slight venous pulsation present over the disc in the right eye but no retinal vascular changes. Fields showed irregular contraction with interlacing of the red and blue.

About April 20, 1913, patient became violent for a few days after which he was comatose until death, April 27, 1913. When examined on the 25th there was nothing new in the fundus except probably a slight congestion of the nasal side of the disc. There was no swelling of the nerve head or retina, nor other evidence of vascular disturbance.

Examination of the brain showed extensive fatty degeneration of cortical cells.

In this series of dementia praecox cases eight, or fifty-three and three-tenths per cent, showed blurring of the disc margins with congestion of the nerve head, but only three of these could be construed as being abnormal. Of the retinal changes arteriovenous compression was found only twice, edema twice, hyperemia, contracted arteries, and perivasculitis once each.

At the same time these examinations were being made notes were kept on the fundus appearance of one hundred normal cases, all students in the University of Michigan, who came in for refraction, and were examined under exactly the same conditions. In these one

hundred normal cases marked veiling of the disc margin, with congestion, was found in nine cases or nine per cent. As these cases in no instance gave evidence of impaired vision beyond that resulting from errors of refraction the fundus condition must be considered as within the limits of normal variation.

The fourth group of cases comprises a wide range of mental conditions not associated with any known central pathology and includes cases of all ages and general physical conditions. No attempt has been made here to rule out any physical condition that would produce a fundus change for such condition is considered concomitant with if not causative of the mental disorder, and hence any symptom should be described as belonging to that condition.

Of the fifty-two cases of this group twenty-eight came with a diagnosis of manic depressive insanity, eleven of whom, thirty-nine and two-tenths per cent, had no fundus change, while of the whole group fifty per cent presented no fundus change. The abnormalities found here were arteriosclerosis, five cases, low grade neuroretinitis five cases, papillitis four cases, retinal edema three cases.

Lidbetter and Nettleship, "In a Pedigree Showing both Insanity and Complicated Eye Disease" (*Brain*, Volume XXXV, Part III, page 195), after describing choroidal disease, detached retina, lenticular opacities, and other ocular defects conclude that there is an association between mental deficiency and ocular defects, partly developmental and partly morbid amongst members of a family who are not known to have had any defined mental or bodily disease, but a large proportion of whom were not well enough endowed mentally and physically to compete successfully in life.

"The mental deficiency in this family tends to appear at an earlier age in each succeeding generation (anticipation); but anticipation cannot be proved for the ocular defects."

The fact that most of these cases were seen in the earlier stages of the disease may account for the high percentage of normal fundi observed, but several cases observed frequently during the year showed no change from one time to another. A well defined intracranial affection may run its course for a long time without causing changes in the ophthalmoscopic picture, and even when a change is observed it is often no index to the nature or extent of the affections as may be seen by comparing the first and fourth groups of this table.

CONCLUSIONS.

(1) Well defined mental disorders from extensive morbid conditions may exist for some time without change in the ophthalmoscopic appearance of the eye grounds.

(2) Cases of dementia praecox, either slowly developing or rapidly deteriorating, show no associated disc changes peculiar to this condition, but on the other hand, show a higher percentage of normal fundi than either the organic or functional groups of psychosis.

(3) In functional psychoses there is no definite association between the mental disorder and the ophthalmoscopic appearance of the eye ground.

The cases here presented were all referred from the Psychopathic to the Ophthalmic department in the University of Michigan, and I am indebted to Doctor Albert M. Barrett and Doctor Walter R. Parker for the privilege of reporting them. I wish also to express my gratitude to Doctor Robert M. Haskell of the Psychopathic Hospital for many helpful suggestions in the preparation of this study.

DISCUSSION.

DOCTOR GEORGE SLOCUM: As has been said the value of this paper and of this series of observations consists largely in its confirmation of the conclusions of older writers, who have made careful observations similar to those which have been made in these cases.

The difficulty in arriving at conclusions in ophthalmoscopic study of the fundus are great, as may be illustrated by the variations in the color of the normal disc. The color of the normal disc varies with the presence or absence of the physiologic cup. A normal disc without a physiologic cup will be much pinker than one the color of which is modified by a large deep cup. We have pseudoneuritis where the apparent color of the disc is abnormal. In such cases the optic nerve entrance or scleral foramen is small and as a consequence the nerve fibres, the sustentacular elements, and the blood-vessels are all so closely concentrated in the papilla that the nerve head seems to be abnormally red and appears to be swollen; superficially the appearance is quite similar to those cases in which the nerve head is actually swollen, that is, true optic neuritis.

In cases where the physiologic cup occupies most of the disc and, as is often the case, is undermined or excavated because of a very large scleral foramen it is often very difficult to determine whether the resulting pallor is indicative of optic atrophy or if the excavation is due to glaucoma with its associated atrophy from pressure; or if we have simply a normal disc with an exaggerated physiologic excavation.

A physiologic cup was recently seen in the Neurologic clinic which was seven diopters deep. In this case the floor of the cup must have been on a plane nearly or quite a millimeter posterior to the posterior surface of the sclera. Such a condition is most satisfactorily explained by a large scleral foramen in consequence of which the nerve fibres separate before they pass through the sclera.

These and many other anomalies and variations, which are entirely within the limits of a normal fundus, not only serve to call attention to the painstaking manner in which Doctor Benedict has conducted his investigations but they may explain some of the mistakes of others whose inexperience or less thorough training in ophthalmoscopy has permitted them to confuse anomalies with pathologic changes and thus arrive at conclusions which have resulted in the compilations of untrustworthy statistics.

TRAUMATIC EPILEPSY: A REPORT OF FOUR CASES FOLLOWING CEREBRAL CONCUSSION; SURGICAL TREATMENT WITH RECOVERY.

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IN two hundred and sixteen cases of epilepsy collected in the Neurologic clinic (Doctor Camp's service) of the University Hospital, there are sixteen cases which resulted from injuries to the head. Four of these followed cerebral concussion without fracture of the skull or contusion of the brain substance. The latter are of special interest from a diagnostic and therapeutic standpoint.

The first case I wish to relate is that of a young man, twenty-five years of age, who developed epilepsy of the Jacksonian type after a severe blow on the right side of the head. The epileptic seizures always began with a paresthesia in the left arm and leg followed by weakness in these extremities. Finally a general convulsion with loss of consciousness ensued. Frequently the left arm and leg remain paralyzed for some time after the convulsion and persisted at one time for a whole week before complete recovery took place. In connection with this condition the patient had a persistent hemianesthesia, organic in type. The tendon reflexes were more prompt on the left side than on the right. Babinski toe-reflex was not present. Other than mentioned, the physical examination was entirely negative. The Wassermann test on the blood was also negative.

The patient was operated upon by Doctor de Nancrède. A large semilunar incision was made (base down) above the Sylvian fissure and between the precentral and central fissures. After the scalp flap was elevated the periosteum was pushed back freeing the bone in which five small drill holes were made. These were enlarged with a larger drill and the spaces between them severed forming a circular opening in the skull. The dura, more tense than normal, was opened making a flap following the outline and size of the opening in the skull. The exposed brain showed nothing abnormal. The dura was replaced and the wound closed in the usual manner. The patient made an uneventful recovery.

The second case, a man, thirty-nine years old, of good physical development and without stigmata of degeneracy and of good habits complained of attacks in which he became unconscious with a tonic and clonic convulsion, marked cyanosis and occasionally incontinence of the urine.

The family history was free from neuropathic and psychopathic tendencies and history of convulsions in early life. He had not had any serious illness. He was injured through a blow on the head sixteen years ago, was unconscious following the injury for a considerable period but made a good recovery. Three or four months later

he began to have headaches and dizzy spells which gradually became more pronounced. The dizziness was followed by unconsciousness and convulsions characteristic of epilepsy occurring at variable intervals, but all of the same character. The examination of this patient showed that there was no injury to the skull. The physical examination was entirely negative. The neurologic examination showed a well-defined hypesthesia and analgesia over the left side of the body, extending one and one-half centimeters to the right of the median line. There was astereognosis of the left hand, but otherwise the neurologic examinations were entirely negative. The Wassermann test on the blood was negative.

The patient was subjected to a trephine operation. An opening the size of a silver dollar was made. The dura was normal in the area of exposure, but a bulging indicated increase of intradural pressure. After opening the dura the cortex underneath was found normal. The opening was closed in the usual manner and the patient made a complete recovery. Twenty days later the sensory disturbance previously present had disappeared and the patient has had no convulsions. He was discharged thirty days after operation, according to the patient's own statement, "in perfect health."

The third case was that of a man twenty-eight years old, of good habits and physically well developed. There is no history of nervous or mental disease and no history of convulsions in early childhood. At the age of thirteen he fell on his head and was unconscious for three hours following the injury. Two weeks after this he developed characteristic epileptic convulsions (paleness of the face, falls suddenly, becomes rigid, clonic convulsions, bites his tongue, has incontinence of the urine, falls into a deep sleep after the seizure). These attacks recurred at variable periods of time, but were all of the same character.

The physical examination showed nothing of importance except numerous scars of the tongue and a number of scars on the face, the result of injuries during the attacks. There was no evidence of a fracture of the skull. Wassermann test on the blood was negative. Blood pressure one hundred and forty millimeters. The patient showed marked mental retardation. His replies to questions were very slow and all of his movements were slow and deliberate. The neurologic examination was otherwise negative.

The patient was subjected to the same operation as the preceding cases, except that the opening was made in the occipital region about one-half inch below the occipital ridge and about one-fourth inch to the right of the median line. The reason for choosing this locality was that this was the location of the injury and that there was the possibility of a fractured skull at the time of the injury with a thickening of the bone. The dura was found very tense and slightly bulging, but otherwise no abnormal condition was found. The patient made a prompt recovery and has not had any seizures since the operation.

The fourth case was that of a previously healthy young man, thirty-

one years old, who received injuries in a railroad accident. He was bruised about the head. There was marked swelling and ecchymosis about the left eye and the skin was cut over the left temple. For several hours after the accident the patient was in a semiconscious state from which he recovered. He complained of deafness in the left ear and blurring of vision. Two or three weeks afterwards he had attacks of vertigo with periods of momentary unconsciousness. These attacks were followed by transient motor aphasia which would last from one or two to twenty-four hours. During the interval there was no speech defect.

The pathologic findings in the physical examination were as follows: The vision was 5/10 in the right eye and 5/15 in the left. The fundus of the right eye showed no pathologic condition; the fundus of the left eye showed a marked congestion of the nerve-head and some edema of the retina (Doctor Walter R. Parker). The hearing was somewhat diminished in the left ear but fairly good in both; otherwise, the ear examination was negative. The nystagmus test showed no pathologic condition (Doctor R. Bishop Canfield).

The movements of the right arm and hand were slower than the left and there was a marked tremor of the right hand on extension. This tremor was not evident in the handwriting. The muscular strength was much better in the left arm and hand than in the right. There was some ataxia of the right foot in walking. The muscular strength of the right lower extremity was noticeably diminished. This weakness involved all of the movements of this member. There was a complete hemianesthesia organic in character, of the right side of the body, pain and temperature sense lost over the same area, loss of sense of position and motion of the right hand and foot, astereognosis of the right hand. The tendon reflexes were all increased but equal on both sides. The umbilical and cremasteric reflexes were absent on the right side. The pharyngeal reflex was absent on the right side; otherwise, the examination was negative. The *x*-ray picture showed nothing abnormal. The Wassermann test on the blood and spinal fluid was negative and the spinal fluid was otherwise also normal. There was, however, a marked increase in the pressure. The spinal fluid came out with a spurt and continued to flow freely for a few moments. A second lumbar puncture was made ten days later. The same amount of pressure was present at this time and thirty cubic centimeters of the fluid were collected. The lumbar puncture was repeated twelve days later and there was still increased pressure. Twenty cubic centimeters were removed at this time. A few days later the patient showed marked improvement. Both the motor and sensory disturbances were less marked. Another lumbar puncture was made fifteen days later. Twenty cubic centimeters of the spinal fluid were removed this time. The pressure was about normal, the fluid flowing slowly drop by drop. The patient continued to improve and six weeks later recovery was apparently complete.

Experience shows that lumbar puncture serves not only as a

diagnostic means but also as a very valuable therapeutic measure. The observations of Lewandowsky, Stadelmann, Finkelburg and others give good evidence of the value of lumbar puncture, not only in cerebral concussion but in a great variety of nontraumatic conditions.

There is no doubt about the favorable results from operative interference in traumatic epilepsy, particularly the Jacksonian form. Every year the list of cases is increased where the epilepsy has either been cured or at least improved, whether the direct cause is due to a compressed fragment of bone, a dural scar, a meningeal or intracerebral hemorrhage, or increased intracranial pressure, the result of concussion without injury to the brain substance or its membranes. Not quite as favorable is the operative procedure in the nontraumatic forms. F. Krause reports, in 1909, more than thirty-eight cases of nontraumatic epilepsy with five cures (with no recurrence after more than five years), also a number of cases that showed marked improvement. In some cases of negative findings on the brain surface or the subcortex an internal hydrocephalus by puncture of the ventricles has been demonstrated with marked improvement following this procedure.

The results of operative treatment, which have been obtained up to the present time in traumatic and nontraumatic epilepsy, are sufficient to warrant this treatment in all progressive cases of epilepsy where there is the slightest suspicion of a local organic cause. Much less can be expected from operative treatment in genuine (general) epilepsy. Kocher rcommended "Ventilbildung" decompression as a compensatory measure for the variations in the intracranial pressure in such cases. Although Kocher's theory was not accepted by a large number of the profession, a goodly number of careful observers have employed Kocher's method or a similar one, and have obtained cures and some marked improvement, such as freeing the patients from the seizures for prolonged periods This result is not infrequent, in fact I may say, that the majority of cases of epilepsy subjected to surgical treatment show some improvement. This of course, would not be so if all cases coming under observation would be treated surgically. Unfortunately, we are unable at the present time to tell whether a case of genuine epilepsy will be favorably influenced by surgical treatment. The basis for operative interference is still very doubtful in a large number of epileptics. Still, any evidence of increased intracranial pressure, which can be demonstrated in a large number of cases by lumbar puncture, should be sufficient to warrant repeated lumbar puncture or a decompression operation, such as was employed in the cases reported in this paper. No harm can come from the practice of lumbar puncture in all cases of epilepsy for the purpose of diagnosis.

With the careful investigations that are at present made along these lines, the time cannot be very far off when the question, as to whether the boundaries of the indications for operation should be extended or made smaller, will become clear.

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DISCUSSION.

DOCTOR ROBERT M. HASKELL: I would like to ask Doctor Klingmann how much headache he gets after removing large amounts of spinal fluid.

DOCTOR REUBEN PETERSON: I have operated upon one or two patients with the Jacksonian form of epilepsy with fairly good results. But these cases were not epilepsy in the true sense of the word but cases where the convulsive seizures were due to injuries and compression of the brain tissue. Relief of this pressure brought about amelioration of symptoms. In true epilepsy very little if anything is gained by any form of operation, except as it results in the removal of abnormal tissue or removes certain sources of irritation. In the past

and even now many unwarranted operations for epilepsy are being performed. Only today I received the following letter which is similar to those I receive half a dozen times a year.

"The wife of ———— has had epileptic convulsions for some four years past. She is now about twenty-seven years of age. There is no history of epilepsy in the family nor of any gross nervous disturbances. Her first attack occurred some five years ago when she became pregnant. They were of a light type at first, but have gradually grown worse. She has dieted, taken all sorts of drugs for relief, but without any benefit. She now has rather severe convulsions every two or three months. Recently she has felt that they might be of ovarian origin, due to the fact that she never had any attacks until she became pregnant, and further, she feels that the attacks are more apt to appear around her menstrual periods. Do you feel that the removal of her ovaries would offer any relief? If you feel that it would, I would ask her to go to Ann Arbor and consult you."

We are only warranted in removing the ovaries from epileptics when these organs are diseased. Removal *per se* does not cure the epilepsy even when the attacks come only at the menstrual periods. Moreover, removal of the ovaries may make the epileptic decidedly worse through the advent of the nervous symptoms due to the artificial menopause brought about by the operation.

DOCTOR THEOPHIL KLINGMANN: In the cases where there is increased intracranial pressure we very seldom have headache following lumbar puncture, even though fairly large amounts of fluid are removed, as long as the pressure is maintained at the normal level. I do not recall a single case of headache following lumbar puncture under such circumstances. In fact it more often relieves the headache which preceded the lumbar puncture.

A STUDY OF CERTAIN TYPES OF MENTAL DISORDERS AND PECULIAR CEREBRAL LESIONS OBSERVED IN CASES OF PERNICIOUS ANEMIA.

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THE fact that pernicious anemia is not infrequently met with among the insane in Michigan institutions, and that in the past few years material from fifteen cases of this disease has come into the laboratory of the Psychopathic Hospital, has raised the question as to whether or not pernicious anemia is of etiologic importance in the production of mental disorders or is but incidental.

Mental abnormalities of various sorts have been recognized as occurring in pernicious anemia, in textbooks of internal medicine and psychiatry. These have largely been conditions of stupor, apathy and a high degree of irritability. Very rarely there have been reported

instances of more developed disorders. Most of these have been classed as examples of amentia, and have prominently shown the influence of the asthenia which forms such a prominent feature in this disease.

Little or no attention has been given to the fact that in this disease there occasionally occur peculiar paranoid conditions which in their symptomatology show the psychogenetic influence of factors which have their basis in the situation of the patient by reason of his physical disease. It is to these paranoid forms that special attention is directed in this study.

In addition to the clinical observations it was possible to demonstrate for the first time in this disease peculiar structural lesions of the cerebrum. The material studied was the clinical records of eleven cases and the anatomic study of nine.

Some of the clinical conditions were so dominated by the characteristics of well known mental disorders that they could not be brought into any etiologic relation to the pernicious anemia. Such were two cases of epilepsy, two cases resembling dementia praecox and one in many ways like a manic depressive psychosis. Apart from these there were six cases which presented a paranoid symptom complex, which it seems stands in very intimate relation to the pernicious anemia. Abstracts from six of these cases were presented. All of the cases in which the history was known showed the occurrence of one or more instances of insanity in the near relatives.

A case typical of the series was that of a man who at the age of forty-six developed pernicious anemia and soon afterwards became suspicious and expressed delusions of persecution. "He was a victim of a conspiracy which had forced him into the hospital. A relative had influenced the physician to drug him. His wife had put poison into his food to get him out of the way." His physical distress and the weakness incident to the disease were to him evidences of the poison. There were auditory hallucinations; "people on the ward said he would be better out of the way; they would get him and fix him." These symptoms continued until the end. The blood on many occasions gave the typical findings of pernicious anemia.

The cases as a whole had in common an irritability and a suspiciousness which formed the ground on which developed delusions of persecution.

The content of the delusions was usually influenced by the somatic-neurologic symptoms and the situation in which the patient was placed as a result of these disturbances. Auditory hallucinations were present in several instances. Some cases showed confabulation suggesting that of Korsakow's symptom complex.

As to the clinical position of these cases it would seem that they must be placed among the paranoid conditions which are symptomatic of a toxic organic process affecting the central nervous system, analogous to the paranoid conditions which have been noted in tabes, alcoholism and from certain drugs.

The study of the cortex in nine cases showed distinct pathologic findings in eight. The structural changes were diffusely distributed but with some variation in focal intensity. The nerve cells were of normal appearance in only one instance. While the types of changes were variable, in several cases there were cells showing the axonal type of reaction, suggesting an injury to the fibre process. That fibre processes were involved in this disease was shown in a number of instances. In two cases there was shown by Marchi's method degeneration of the intramedullary part of the hypoglossal nerve. The neuroglia usually showed progressive reaction changes.

The most constant alterations were in the blood-vessels. In most instances the intima showed proliferative changes. The walls of the vessels were pathologically crowded with lipoid products.

The most important findings in this study were numerous small focal areas of fibre degeneration. In their earliest stages these showed as focal accumulations of fatty products inside of epithelioid cells resembling small focal softenings. Older lesions showed an absence of fibre structures and an increase in the neuroglia. In their histology they resembled the lesions which have often been observed in the spinal cord in pernicious anemia. These lesions, which must be regarded as having a certain specific character for this disease, were found in three of the cases studied.

The conclusion of the study was that mental diseases may occur associated with pernicious anemia, which seem to be of more than incidental importance, and that these are not always of the usually described amentia type, but are more chronic and show resemblances to mental disorders symptomatic of toxic conditions.

Further, that pernicious anemia may be associated with pathologic changes in the cortex of the brain which in their finer aspects are such as have been observed in mental disorders associated with toxic influences and in addition specific lesions which resemble those occurring in the cord in this disease.

Oxford Road.

DISCUSSION.

DOCTOR THEOPHIL KLINGMANN: The pathology of pernicious anemia as presented by Doctor Barrett in his paper is very interesting, especially the pathologic changes in the brain which have never been fully described before and show a very decided step forward in getting at the causative factor of the mental disturbances in pernicious anemia. The cases of pernicious anemia which we see in the Neurologic clinic and in private practice do not show such severe mental symptoms as the cases which Doctor Barrett presented. But I may say that practically all the cases even very early in the disease show mental symptoms, such as mild periods of depression with emotional states and general irritability, so that very early in the disease these might be classed with some of the functional nervous disorders and oftentimes if a careful blood examination were not made they would pass as such.

On the other hand in many cases these mental symptoms never become any more pronounced even though these cases eventually succumb to this disease. It appears therefore as Doctor Barrett stated that a psychopathic heredity is an important factor in the cases that develop these pronounced mental symptoms.

REPORT OF A CASE OF CONGENITAL CYSTIC KIDNEY ASSOCIATED WITH A UTERINE FIBROID.

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CONGENITAL cystic kidney is a rare disease and always interesting from the standpoint of diagnosis, if not of treatment. Usually these cases are found at postmortem, so that it is unusual to have a patient like the one I show this evening, where the associated disease furnishes an indication for intraabdominal treatment and whereby the correctness of the diagnosis, congenital cystic disease of the kidneys, can be verified.

This woman was referred to the Obstetric and Gynecologic clinic by her physician, Doctor William Shilliday, of Lake Ann, Michigan. She is thirty-seven years of age and married. Her family history is negative. She has always enjoyed good health, never having been ill except with the common diseases of childhood.

Menstruation appeared at the age of thirteen. She was regular up to three years ago when her periods were lengthened. The flow is darker than formerly and at times contains clots and particles which resemble flesh.

She has had three children, one a premature birth at seven months, cause unknown. She was lacerated at child-birth, the lacerations having been repaired three years ago.

Three years ago she noticed a mass in the right flank, but it gave her no pain and she paid no attention to it. For the past three months it has increased greatly in size, and she has considerable pain and a constant dull ache. Sometimes the mass seems smaller. She has never noticed that at times she passed larger quantities of urine than at others. Recently the patient has noticed a mass in the suprapubic region.

Examination, May 6, 1913.—The patient is of medium build, skin being somewhat cachectic. The abdomen is above the rib level and is not rigid. On the right side from a point two fingers breadth above the umbilicus is a cystic, nodular mass about the size and shape of a man's hand, extending to the right iliac crest and downward into the right flank. It is unaffected by respiratory movements, but is slightly movable from side to side, but less so in an anteroposterior direction. The mass is easily lifted by pressure made in the lumbar region. There is flatness over this same area. In the median line is a smooth, firm tumor mass arising from the pelvis, extending half way to the umbilicus. Apparently there is no connection between this mass and the one in

the right flank. In the left flank is an irregular mass similar to the one in the right flank, but much smaller. In the epigastrium is a cystic growth quite spherical and like a saucer in shape. This mass appears sessile and rather immovable. Vaginal examination shows the cervix running into the suprapubic mass described above, which is movable from side to side and slightly movable in an anteroposterior diameter. Appendages appear to be normal. Examination of the urine shows the specific gravity to be 1014. There is no albumin nor sugar, but fairly numerous hyaline and finely granulated casts.

Cystoscopic examination was negative. A phenolsulphonephthalein test showed that the kidneys had diminished functionating power.

Operation, May 16th, 1913, by Doctor Peterson.—The abdomen was opened by a median suprapubic incision. The uterus was the seat of a large soft fibroid tumor. The left tube was greatly dilated and sausage-shaped. Underneath the peritoneum in the kidney region on each side there was found a large cystic kidney, the one on the right being much larger than that on the left. The outer surface was covered with smaller cysts. Just above the transverse colon there was an omental cyst about the size of two fists and the liver was studied with small cysts. There was a large amount of free ascitic fluid which was clear in color. No attempt was made to remove the cysts. The fibroid uterus was removed by supravaginal hysterectomy and the enlarged cystic tube on the left was also removed. The stumps were covered with peritoneum. There was free oozing from the layers of the broad ligament on the left where the tube had been attached.

As far as could be determined by palpation there were not other cysts except those mentioned above. The patient has made an uninterrupted recovery so far as the hysterectomy is concerned. The case is reported because of its comparative rarity and because it is exceptional to be able to verify the diagnosis of congenital cystic kidney by a laparotomy for another pathologic condition. Usually the diagnosis is confirmed by autopsy.

There is quite a literature on congenital cystic kidney, although naturally it is more abundant on the pathologic than the clinical side.

I have thought it best to conclude this brief report of a very interesting case by abstracting at some length the most excellent paper by Doctor F. B. Lund, of Boston, which appeared in the *Journal of the American Medical Association* in 1906:

* * *

Congenital cystic kidneys are rare. The condition is hard to explain. It frequently runs its course without being diagnosed, the real cause of the renal insufficiency being discovered at autopsy.

Pathology and Etiology.—The whole organ is studied with cysts of various sizes and colors. Walls of cysts are thin and vascular, the larger ones showing folds on inner surface. Fluid consists of urinary constituents. Between the cysts are more or less extensive areas of normal renal parenchyma; other cysts are separated merely by fibrous

tissue. Efferent passages frequently show no changes. In some specimens they are shrunken, narrowed and may be almost obliterated.

Cystic kidneys are usually bilateral; if unilateral the other kidney is usually hypertrophied. This degeneration may have an unfavorable influence upon the development of the fetus causing premature birth. The child may live only a few moments after birth or a few days, dying from respiratory failure. Death may result early from renal insufficiency. On the other hand, the amount of normal renal tissue may be sufficient to prolong life for indefinite periods before renal insufficiency results in death. Conditions are most favorable in unilateral cases with hypertrophy of the opposite kidney.

Theories.—Neuwerck, Hufschmidt and von Kahlden claim that these tumors are cyst-adenomata. An argument against this is the fact that the cysts may often be demonstrated to be dilations of the renal tubules and contain urine often diluted with serum but showing distinct urinary constituents. Brigidi and Severi have relied upon epithelial proliferations and connective tissue growths as evidence of tumor growth or adenoma. These, however, have been shown by Mutach to be tissues characteristic of embryonal kidneys. The presence of proliferations is an argument in favor of the developmental rather than the neoplastic origin of the tumors. The oldest theory (Virchow) that the urinary concretions, "uric acid infarcts," so common in the new-born, have plugged the canals is contrary to the fact that these are rare during intrauterine life and after birth so common that cystic kidneys, if due to them, ought to be much more frequent than they are. Later Virchow acknowledged that there must be an organic obstruction and actual obilteration of the tubules. His later view was that the condition results from a fetal inflammation, involving the papillæ with resulting obliteration.

The fact that other congenital malformations frequently coexist is in favor of the theory that the condition is a developmental malformation. Moscowitz found congenital cystic liver with cystic kidney in nineteen per cent of the cases. Hypospadias, astresia and absence of ureter, vagina, bladder, et cetera, also harelip, spina bifida, or absence of extremities have been found with cystic kidneys. The general agreement among investigators now is that the condition is due to defective development.

Bunting believes that the primary cause of the trouble is the epithelial hyperplasia which forces out the walls of the tubules. However, this theory does not explain why we get cystic forms instead of epithelial growths. Author concludes that it is a developmental condition, a malformation rather than a new growth. A fact speaking strongly in favor of the malformation origin is the occasional occurrence in several generations of the same family, showing a tendency to inheritance.

The condition has oftenest been observed in the middle decade of life. In the adult the pathology corresponds to that of the new-born,

except that the individual cysts are larger, as are also the entire kidneys. If our explanation is correct we must assume that in cases of cystic kidney in the adult, the condition has existed since birth, but has not until later years given rise to symptoms which attract attention.

Symptoms and Diagnosis.—Milward, of Birmingham, divides the clinical history into three stages:

(1) The stage of progressive enlargement of one or both kidneys without subjective symptoms, the enlargement being discovered by accident. This stage may last from a few months to several years.

(2) The stage of subjective symptoms and objective signs. This stage lasts from a few months to six or eight years, or even longer. The signs and symptoms are dependent on the size and weight of the tumors.

(3) The stage of decreasing elimination of urine. In this stage appear the symptoms of uremia or cerebral complications. It lasts two or three weeks or a few months.

Males and females are affected in about equal numbers. The disease usually terminates fatally in the fourth, fifth or sixth decade. Renal enlargement is rarely discovered before adolescence, and when it develops in infancy the child hardly ever lives until the tenth year.

During the second stage the kidneys are capable of continuing their functions almost perfectly.

Duration of the Disease.—Ritchie found the average in seventy-five cases to be 45.3 years.

Duration of Symptoms.—In the majority of cases the symptoms continue from a few months to five or six years. Twenty-two and nineteen years was the duration of symptoms in the longest cases noted.

Of seventy-eight cases analyzed, thirty had renal symptoms apart from albuminuria. Sixteen had hematuria at some time. Seven had no kidney trouble and no evidence of illness, but cystic kidneys were found postmortem. Eleven suffered from edema or had suffered from it. In ten there was no edema. In thirty-three the urine contained albumin, in nineteen a trace and in eleven a considerable quantity. Vomiting or intestinal symptoms, constipation or diarrhea were present in nineteen. Twenty showed anemia, cachexia or loss of flesh. Thirteen had dyspnea or some pulmonary affection. In twenty-one the tumor was discovered during life in one or both flanks.

Treatment.—Bevan, Syms, Krönlein and others have successfully removed congenital cystic kidneys. Schmid, Niemeyer, Bardeleben, Hayems and others have performed nephrectomy for polycystic kidneys but their patients died of uremia. Upon autopsy the other kidney was found to be the seat of rather extensive disease.

The conclusion is evident that while from hemorrhage or suppuration in a cystic kidney or from symptoms due to the size of the tumor nephrectomy may be indicated, it should never be performed until by exploratory incision or ureteral catheterization the other kidney has

been found healthy. In operating on obscure kidney tumors it is well to bear in mind congenital cystic kidney.

Curtis and Kammerer have practiced incision and breaking down the walls of larger cysts sufficiently to reduce the size of the kidney and suture the organ to the lumbar muscles. This is far safer than nephrectomy and accomplishes the desired result of diminishing the size and mobility of the tumor and relieving pressure on the remaining tubules in the simplest and safest way.

CONCLUSIONS.

(1) If there be sufficient healthy tissue between the cysts to perform the normal renal functions the disease may never attract attention and the patient may live a normal life and die of disease independent of the kidneys.

(2) Under the same conditions as the renal tissue, while the renal excretion is normal, the cysts may cause pain and discomfort from their size and weight without dangerous symptoms for years. Mobility of the kidney with its accompanying trouble may result from this enlargement.

(3) The growth and enlargement of the cysts may so strangulate and compress the normal kidney tissue between them as to throw it out of commission, so that stasis and uremia may result.

(4) The normal tissue between the cysts may become affected by the various forms of nephritis, just as the healthy kidney may, and this nephritis may be fatal in itself or by reason of the cardiac and arterial changes which accompany it.

(5) These same cardiac and renal changes may and do accompany the compression of the intervening tissue by the cysts and are not an infrequent cause of death in these cases.

(6) The surgical aspects of the disease relate to the pain and discomfort due to the size of the tumors or the mobility resulting from them, and in operating for these conditions it is all important to remember the pathology of the disease and more especially the fact that it is bilateral in ninety-eight per cent of the cases. A cystic kidney, while causing pain and disability by its enlargement, may still be performing so large a part in urinary excretion that its removal would be dangerous to life from renal insufficiency.

(7) It, therefore, becomes important if possible to take some means to diminish the size of the offending organ and anchor it in place without interfering with its secreting functions. Such a procedure, which will be vastly safer than nephrectomy, consists of free incision and puncture of the larger cysts, thus diminishing notably the size of the kidney, and suturing of the organ in position. If for any reason a nephrectomy seems desirable it should not be performed unless an exploratory incision or ureteral catheterization has shown that the other kidney is healthy.

CARCINOMA OF THE UTERUS TREATED BY THE PERCY CAUTERY METHOD, WITH AUTOPSY.

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MRS. W. (Gynecologic number 4773), aged fifty-three, entered the Gynecologic clinic January 17, 1913. Her family and personal history are negative except perhaps the occurrence of erysipelas of the face at twenty. She had been twice married and had been pregnant twice, abortions being produced in both instances by "instruments and medicine." This is somewhat interesting as her pelvic measurements show so marked a degree of contraction that delivery at term would have been practically impossible.

Present Trouble.—The patient entered the University Hospital for "general weakness," dragging pain in pelvis, and irregular, excessive bloody discharge. Her menstrual history had been practically normal till about two years ago when her periods became somewhat more frequent, irregular and increased in quantity. This preceded the pain by many months, and was supposed by the patient, as is so frequently the case, to be merely a normal manifestation of the menopause. Like so many of her "suffering sisters," she consulted the newspapers instead of the doctor, and acting upon their competent advice, put herself into the ever friendly hands of Lydia Pinkham. After a few weeks she changed to Wine of Cardui—and after a few more weeks came to the hospital with a squamous cell carcinoma of the cervix, too far advanced for hope of cure by radical operation.

Examination (briefed).—Abdominal wall moderately thick; epigastrium tympanitic but dullness in both flanks and over lower abdomen; no masses palpable, no rigidity or tenderness; external and internal perineum intact; cervix is enlarged; there is a firm nodule with an irregular external os through which the finger can be easily passed. There is a large crater, the tissue on the sides is very friable and bleeds easily. The discharge is profuse and very foul. The cervix seems firmly fixed; infiltration can be felt on either side but does not seem to involve the rectum or bladder.

Operation.—Cauterization for cancer, January 24, 1913, by Doctor Peterson. The abdomen was opened by a median suprapubic incision. The involvement was found to be only moderate, being more towards the rectum and bladder than laterally. However, there was some involvement in the left broad ligament. The introitus was so small that the muscles had to be cut on either side and even then a water-cooled speculum could not be used. A short proctoscope was used and the cancer thoroughly cauterized, the cauterization being directed by the assistant's hand in the abdomen. At the completion the induration was soft all around and the case appeared as a very favorable one.

Course.—Patient reacted without nausea and was very comfortable the following day though temperature reached 102°; in the succeeding days the patient was practically free from pain, and with permanganate douches 1-5000 the free discharge of sloughing cauterized tissues was not offensive. She recovered her strength slowly because of several complicating factors such as vaccination, sore throat, et cetera. On March 7, after walking about comfortably she developed facial erysipelas and was removed to isolation. Returning May 4, she developed a posterior tibial or popliteal phlebitis which persisted in spite of treatment. The patient gradually became worse, lost weight, vomited almost constantly and was irrational and comatose at times. An irritating cough added to the picture. After April 25, erysipelas again appeared, and she was again transferred to isolation; the affected leg went on to suppuration and was opened in several places by Doctor Wallace E. Hopkins. The patient died in isolation May 7.

Clinical Diagnosis.—General carcinomatosis; based on the history, palliative operation only, cachexia, vomiting and lung signs.

Autopsy.—Performed May 8, 1913, by Carl V. Weller. Organs showed, in the *gross,* no evidence of metastases; the rectum had not been infiltrated by the neoplasm; posterior and to the side of cervix was an opening into the vaginal vault, surrounded by firm tissue; the cavity of the uterus was darkened and discolored; the cavity was large, and the wall nearly gone, consisting of scar tissue; there were some irregular papillary projections on the uterine wall.

Microscopic Findings.—Doctor Aldred Scott Warthin.

Lung: Atrophic emphysema; chronic passive congestion.

Heart: Simple and brown atrophy; slight fatty degeneration; fatty infiltration; coronary sclerosis; thickening of endocardium; fibroid patches in heart.

Kidney: Acute parenchymatous nephritis; simple atrophy and numerous scarred glomeruli; sclerosis of renal artery; old infarct.

Liver: Hyperplasia of islands of Glisson; small-celled infiltration; dilatation of bile ducts; a Glissonian cirrhosis; marked fatty infiltration and degeneration; cloudy swelling; chronic cholecystitis.

Spleen: Thickening of capsule; increase of stroma; chronic passive congestion; atrophy and sclerosis.

Pancreas: Dilatation of the acini with hyaline degeneration of the epithelium; all ducts dilated.

Aorta: Fatty degeneration of intima.

Stomach: Slight atrophy.

Intestine: Negative.

Retroperitoneal Lymph-nodes: Chronic lymphadenitis. Some with an acute inflammation; some with hyaline masses; no tumor metastasis found.

Uterus: Cervix shows cystic glands with chronic catarrh; endometrium made up of necrotic carcinoma tissue; in the wall beyond the

area of necrosis are numerous nests of living carcinoma cells. Small cellular myofibroma.

Conclusion.—This case is interesting in that the recurrence of the carcinoma nearly four months after cauterization was almost absent. The operation was not done with the hope of cure but the absence of metastasis and the comparatively small remaining malignant growth seems to warrant the conclusion that except for the unusual complications, which have not occurred in previous cases, the patient could have been given many months of comfortable existence.

312 Thayer Street North.

REPORTS OF CASES.

A CASE OF ERYTHEMA IRIS WITH BULLOUS LESIONS OF THE MOUTH AND MELENA.

UDO J. WILE, M. D.
Department of Dermatology and Syphilology.

THE case presented before you this evening is one of unusual interest. The members present may remember the case of pemphigus vulgaris, which I showed in one of the early meetings of the year. At that time I mentioned that in the differential diagnosis, one had to consider bullous erythema, and I am most fortunate this evening in being able to demonstrate such a case to you.

Exudative erythema is, of course, a very common disease. The erythematous and papular types are by far the most common seen. In this clinic within the last three weeks, we have had three cases of the scarlatiniform type. Exudative erythema with true bullæ is a very rare finding. It represents the most intense form of this type of toxic dermatitis. Of more than usual interest in this case is the presence of bullæ in the mouth. When the patient first came to this clinic a few days ago, the mouth was in a deplorable condition. The buccal surfaces, pharynx and lips were represented by an extensive, superficial necrosis, due to ruptured bullæ. This factor was extreme. The patient could take food only in liquid form. Of more than passing interest is the presence of a bulla of the conjunctiva, and bullous lesions in the anterior nares. If one had this picture only, without the accompanying skin affection, the condition would be indistinguishable from pemphigus vulgaris.

Turning now to the eruption on the skin, this shows lesions of the typical so-called iris-form; concentric erythematous rings with central bullæ. In a few places you will note that the erythematous rings have become bullous, giving the appearance of ringed bullæ. Of great importance in the differential diagnosis, is the location of these lesions. In pemphigus, you will remember, the sites of predilection are the flexures, groin, arm-pit and genitalia, although the eruption may be general. In the case before you the eruption is entirely localized in the extremities.

Pemphigus vulgaris is uniformly associated with eosinophilia. In this case the eosinphile count was five per cent. Whereas the exudative erythema is really a benign affection, the bullous type is occasionally very severe and is associated with hemorrhages from the mucous surfaces. The patient before us had a very decided melena. His stools still show the presence of blood, indicating the presence of lesions in the mucous membranes. The prognosis at the onset was not a very bright one, owing to the extreme prostration and the profound toxemia. I am glad to say, however, that the patient has improved markedly within the last few days. The lesions in the mouth are rapidly clearing up and he bids fair to make an excellent recovery. There has been throughout a temperature varying from 100° to 102°.

To recapitulate then:

(1) The striking features of this case are the similarity of the mucous membrane lesions to pemphigus vulgaris.

(2) The serious influence of an otherwise relatively benign disease.

(3) The presence of bullous lesions in the mucous membranes and in the conjunctiva.

(4) The association of the entire condition with occult blood in the stools, without any active gastrointestinal subjective symptoms.

About one year ago this patient was treated at the University Hospital for a similar condition, which was diagnosed at the time as erythema iris.

THE DIETETIC MANAGEMENT OF A CASE OF DIABETIC GANGRENE.

MARK MARSHALL, M. D.
Department of Practical Therapeutics.

THIS case is particularly interesting because of the remarkable improvement that has occurred under dietetic treatment. Twelve weeks ago when the patient entered the University Hospital he gave a history, in brief, as follows:

For six years he has known that he has had diabetes, but has never taken any special treatment for the condition. Three weeks ago, the patient developed a small spot of discoloration in the great toe of the left foot. This was examined by a physician, who made a diagnosis of diabetic gangrene. The diet was restricted somewhat, but not to the extent that it should have been. The gangrenous condition progressed and the toe was amputated. Following the operation, the wound became gangrenous and the process extended rapidly over the foot. On account of this rapid extension of the process, the leg was amputated about half way between the knee and ankle. This operation was also followed by a gangrenous condition of the stump, for which condition he was brought to the University Hospital. When he entered the medical ward, he was very toxic, both as the result of the local infectious process, and an acidosis which complicated the diabetes. He had a temperature of 103°, a very rapid pulse, and a leukocyte count

of eighteen thousand. He was somewhat stuporous and had an acetone breath. The urine contained diacetic acid and about one per cent of sugar.

In selecting a diet for this patient, two conditions had to be considered, both presenting complicating therapeutic indications. Manifestly, the gangrenous process would be best treated by a strict carbohydrate-free diet, for one might expect such a diet to lower the glucose content of the blood to a minimum, which would in turn favor the healing process in the stump. An excess of sugar in the diseased tissue would not only interfere directly with the healing process, but would also increase the local infectious process by furnishing a better culture medium for the invading organism. However, such a restriction of the diet might be expected to increase the formation of acetone bodies and thus increase the danger of coma. Inasmuch as the local process seemed to be the more serious factor in the case, it was decided to place the patient upon a strict carbohydrate-free diet and to combat the threatening acidosis by the administration of a large amount of sodium bicarbonate. This treatment, together with antiseptic dressings applied to the gangrenous stump, was carried out for six weeks, and the patient showed a steady improvement both in the general and local condition. When the wound became clean, carbohydrates were added to the diet, and the patient is now taking the equivalent of seventy-five grammes of bread per day. This amount of carbohydrate, if properly metabolized, is sufficient to prevent the formation of acetone bodies and therefore obviates the necessity of giving an antacid. The wound is entirely healed at the present time, the urine is sugar free, and the patient feels perfectly well.

In order that he may wear an artificial leg, a plastic operation upon the stump will be necessary. Of course it will have to be done with extreme caution, in order to prevent a recurrence of the gangrene and the possible development of a fatal acidosis.

Note—May 29, 1913, a plastic operation was performed a week ago under nitrous oxide and oxygen. Since the day of the operation, the patient has received a strict carbohydrate-free diet, but has been given no alkili. The urine has been sugar-free and the stump is healing nicely.

TRANSACTIONS
OF THE
CLINICAL SOCIETY
OF THE
UNIVERSITY OF MICHIGAN

STATED MEETING, JULY 16, 1913.

THE PRESIDENT, CYRENUS G. DARLING, M. D., IN THE CHAIR.
REPORTED BY REUBEN PETERSON, M. D., SECRETARY.

READING OF PAPERS.

AN ANALYTICAL STUDY OF TWO HUNDRED CASES OF PELVIC INFLAMMATORY DISEASE.

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INSTRUCTOR IN OBSTETRICS AND GYNECOLOGY IN THE UNIVERSITY OF MICHIGAN.
ANN ARBOR, MICHIGAN.

(From the Obstetric and Gynecologic Clinic.)

PELVIC inflammatory disease is one of the conditions which the general practitioner, as well as the gynecologist, is frequently called upon to treat. Because of this fact a discussion of the subject is always of interest and value.

As a basis for this paper, I have studied the histories of the last two hundred patients who have been treated surgically during the last four years in the gynecologic department of the University Hospital for inflammation of the pelvic structures.

Pelvic inflammatory disease, broadly speaking, is any infection of the uterus, tubes, ovaries, pelvic peritoneum, or pelvic cellular tissues. So commonly are the Fallopian tubes the seat of the active process that salpingitis, in the acute or chronic stages, is often spoken of as pelvic inflammatory disease, but involvement of the tubes alone is very uncommon.

Etiology.—The bacteriology of pelvic infections has been well worked out. Of the organisms causing this disease, the gonococcus is most often the offender and is followed closely by the streptococcus. Other organisms, as the staphylococcus, colon bacillus, bacillus of tuberculosis and pneumococcus do produce pathologic conditions in the

pelvis. The following table gives the results obtained from a series of two hundred cases.

TABLE I.

Etiologic Factors.

CAUSE OF INFECTION.	NUMBER OF PATIENTS.	PERCENTAGE.
Gonorrhea	76	38. %
Sepsis following abortion	36	18. %
Sepsis following confinement	51	25.5%
Tuberculosis	21	10.5%
Questionable origin	16	8. %
Total	200	100. %

It is evident that gonorrhea leads the list of etiologic factors, showing thirty-eight per cent. If it is true that fully one-quarter of the cases of sepsis following abortion and full-term labors, can be traced to a former gonorrheal infection, the percentage in this table would be raised to forty-eight per cent. If to this we add the greater part of the eight per cent of questionable origin, gonorrhea would probably be properly credited.

Sepsis following criminal and accidental abortion, also after confinement accounts for many of the most virulent and fatal cases of pelvic inflammatory disease.

It is remarkable that so many cases of pelvic tuberculosis appear in this series and probably ten and five-tenths per cent would be relatively too high if the cases had not been collected from an institutional clinic.

Pathology.—Acute pelvic inflammation gives various pathologic pictures. Following an endometritis, if the virulency of the invading organism is slight, the tubes may show congestion and some thickening of their walls which are infiltrated with leukocytes. Some of the fimbriæ may be bound together. More often the fimbriated extremities of the tube become closed off due to a greater inflammatory reaction. The tube curves itself about the ovary or attaches itself to the broad ligament. There may or may not be exudate poured out. Where a purulent collection forms in the tubes, these structures are soon fastened to adjacent organs by plastic exudate. Nature kindly sends down the omentum and intestines to wall off the pelvis from the general peritoneal cavity. In this way the posterior culdesac comes to contain one or two large abscesses. At times the ovaries contain purulent collections. In highly virulent streptococcus cases a general peritonitis sometimes develops, or the organism, traveling out through the lymphatics from the uterus, involves the cellular structures.

Some pathologists attempt to describe various forms of chronic pelvic inflammatory disease, but the truth of the matter is that chronic inflammatory disease is a residual condition following an acute one. An exception to this is found in the tuberculous type where the onset is usually insidious. However, because the process is old it must not

be thought that the pathology is harmless. Very often chronic pus-tubes, fibroid, nodular tubes, chronic ovarian abscess, et cetera, are harboring virulent germs and when these are liberated at operation, peritonitis rapidly develops. Dense bands of adhesions are the most common signs of chronic inflammatory infection.

Table II shows the number of acute and chronic cases and the amount of involvement of the pelvic structures.

TABLE II.

Involvement of Structures.

ORGANS.	NUMBER OF CASES.
Uterus	3
Uterus, tubes and ovaries	153
Both tubes and ovaries	10
Right tube and ovary	10
Left tube and ovary	19
Left tube	1
Left ovary	2
Both ovaries	1
Pelvic cellulitis	1
Total	200

Tables III, IV and V show the structures involved in the various types of infection.

TABLE III.

Involvement in Gonorrheal Cases.

ORGANS.	NUMBER OF CASES.
Uterus	2
Uterus, tubes and ovaries	58
Both tubes and ovaries	4
Right tube and ovary	6
Left tube and ovary	6
Total	76

TABLE IV.

Involvement in Puerperal and Abortion Cases.

ORGANS.	NUMBER OF CASES.
Uterus, tubes and ovaries	59
Both tubes and ovaries	6
Right tube and ovary	4
Left tube and ovary	13
Left tube	1
Left ovary	2
Both ovaries	1
Pelvic cellulitis	1
Total	87

TABLE V.

Involvement in Tuberculous Cases.

ORGANS.	NUMBER OF CASES.
Uterus, tubes and ovaries	21

Involvement in Cases of Questionable Origin.

ORGANS.	NUMBER OF CASES.
Uterus	1
Uterus, tubes and ovaries	15
Total	16

In seventy-six and five-tenths per cent of the cases all of the generative organs were involved. The left appendages were oftener involved than the right.

Pelvic inflammatory disease shows a definite relation to the periods of greatest sexual activity and child-bearing. This is emphasized in Table VI.

TABLE VI.

Age.

YEARS.	NUMBER.
10-15	1
15-20	5
20-25	39
25-30	25
30-35	42
35-40	37
40-45	26
45-50	18
50-55	6
55-60	1
Total	200

A study of the type of infection in relation to the ages of the patients gives the following figures:

TABLE VII.

Age and Type of Infection.

AGE.	GONORRHEA.	ABORTION.	PUERPERAL SEPSIS.	TUBERCULOSIS.
10-15	0	0	0	1
15-20	8	2	5	2
20-25	28	18	14	7
25-30	12	14	13	3
30-35	8	7	7	4
35-40	11	4	7	2
40-45	3	1	5	1
45-50	5	1	0	1
50-55	1	0	0	0

All types of pelvic inflammatory disease are most frequent between the ages of twenty and thirty years, while after forty years the disease is relatively infrequent. The youngest patient was thirteen years of age and had a tuberculous infection. The oldest patient was fifty years of age and had an acute gonorrheal infection of one month's duration.

In the cases studied, one hundred eighty-two of the patients were married and suffered from gonorrhea, sepsis or tuberculosis. The majority of these patients contracted gonorrhea from their husbands, many of the abortions were criminal and were performed by the patients. Tuberculous infections followed abortion or child-bearing in several cases.

There were eighteen single patients. Of this number eleven had gonorrhea and four had tuberculosis.

The question of sterility following a pelvic infection is most interesting. It is well known that gonorrhea and tuberculosis usually involve the tubes, causing them to be sealed off, while a streptococcus infection involves the parametrium and peritoneum. The number of children and some of the causes of sterility are shown in the table which follows:

TABLE VIII.

Married Women.

CHILDREN.	NUMBER.
0 para	45
1 para	45
2 para	38
3 para	26
4 para	17
5 para	4
6	3
7	3
8	1
Total	182

Sterility due to gonorrhea	36 cases
Sterility due to tuberculosis	7 cases
Sterility due to questionable infection	2 cases
Total	45 cases

The general condition of patients suffering from pelvic inflammatory disease is of great importance because the greatest good comes from operative procedures and surgical risks are of two kinds, good and bad. Certainly the majority of the patients who suffer from either acute or chronic pelvic infection, are poor risks unless handled properly.

Nine patients out of one hundred showed a normal blood picture; the remaining eighty-one patients had secondary anemia. The most

common conditions found were, anemia, hemic heart murmurs, heart lesions, myocarditis, nephritis and gastrointestinal disturbances.

Symptoms.—The symptoms and signs of acute pelvic inflammatory disease are as follows: Pain in one or both lower quadrants of the abdomen, fever ranging from 100° to 105°, profuse leucorrheal discharge in the gonorrheal cases but sometimes in septic cases the discharge is only moderate or absent, leukocytosis, abdominal tenderness and muscle rigidity, pains increased by movement; on vaginal examination, marked tenderness of the pelvic structures; inability to outline the organs because of spasm or exudate; at times distinct masses in the lateral pelvic regions or culdesac; fluctuation of large abscesses.

In chronic conditions the patient has exacerbations of the old trouble from time to time. Often these attacks precede the menses and dysmenorrhea is common. Often the symptoms of retrodisplacement are given as frontal headache, lumbar backache, leucorrhea, constipation, et cetera. Examination often reveals a retroverted, tender, adherent uterus, but when the uterus is forward, there is thickening in the tubal regions and the ovaries are unusually sensitive and immobile. This last sign is by far the most important.

Diagnosis.—The diagnosis of pelvic inflammatory disease is usually easy to make because the history is helpful. If a young woman marries and a few weeks or months later comes for treatment of a profuse leucorrhea, smarting and burning upon urination, vulvovaginal abscess, abdominal pain and tenderness, gonorrhea is usually a good diagnosis. If following an abortion or confinement the patient has chills, fever, prolonged flow of bloody lochia, a large tender uterus, feeble pulse, marked anemia, she probably has a mild sepsis. Virulent streptococcus infection is not difficult to diagnose, because of the intense symptoms. Beside a family history and pulmonary involvement the following points outlined by Kelly are useful in the diagnosis of tuberculous disease of the pelvis:

First, extensive pulmonary disease associated with pelvic inflammatory masses.

Second, where a persistent uterine discharge or uterine curettings are found to contain tubercle bacilli.

Third, where there is pelvic inflammatory disease associated with irregular ill-defined masses with fluctuation in the lower abdomen, and the latter are noted at subsequent examinations to have changed their relation.

The examination of smears from the cervix and a diagnostic curettage are very useful measures. I wish to emphasize the importance of ether examinations where the patient is too tender to allow a careful bimanual examination. Many supposed inflammatory cases have been found to be cases of hysteria and neurasthenia.

Treatment.—Pelvic infection, like other infections, requires general measures, such as absolute rest, stimulation of the emunctories; locally cold applications give relief. In the acute stages, hot, long continued

vaginal douches hasten the softening of exudate, lessen congestion and relieve pain. When a definite mass can be outlined and pus is undoubtedly present, a posterior colpotomy gives the best results. The operation is simple and has only a few dangers attending. These are: tears of the rectum, damage to the uterine arteries or the ureters. These can be avoided by stripping back the posterior vaginal mucosa from the cervix and with it any rectocele which may be present. Always work in the median line and against the cervix. In this way the vessels and ureters can be passed without harm. After the finger or blunt scissors is past the danger zone, the masses can be punctured laterally. The value of this operation is great. Some patients return for a radical removal of the involved organs several months after the posterior colpotomy has been done. By that time the inflammation has lost its virulency and the abdominal operation is without incident. However, many women are so greatly relieved that the laparotomy is never performed.

In the chronic cases a laparotomy is necessary to obtain a cure. The objects of the abdominal operations are: first, to release adhesions; second, to remove diseased organs; third, to restore the organs which can be saved to as near normal condition as possible. No one branch of operative gynecology is so difficult as radical operations in inflammatory cases. A surgeon who intends to do a hysterectomy at the beginning of an operation, may find himself anastomosing intestines, repairing the bladder, transplanting the ureter and various other things before the operation is completed. Not only this but foci containing virulent organisms may be hidden in the pelvic debris and a splendid operation may be followed by peritonitis and death.

The nature of the operations performed on the two hundred cases studied is recorded in the following:

TABLE IX.

Operative Procedures.

OPERATION.	NUMBER.
Panhysterectomy and bilateral salpingo-oöphorectomy	38
Supravaginal hysterectomy and bilateral salpingo-oöphorectomy	54
Posterior colpotomy	38
Laparotomy, freeing adhesions	22
Bilateral salpingo-oöphorectomy	4
Right salpingo-oöphorectomy	17
Left salpingo-oöphorectomy	19
Left salpingectomy	2
Right oöphorectomy	1
Left oöphorectomy	5
Total	200

It was possible to save all of the pelvic organs in sixty cases. In forty-eight cases some of the organs were saved, in most instances the

ovaries. Ninety-two patients had all the internal generative organs removed.

Complications.—Suppuration of the abdominal wound is a frequent complication and is due to contamination in removing septic organs and to the poor resistance of chronic septic patients. Tears in the intestines occur in freeing adhesions and are especially liable to occur in tuberculous infections. Phlebitis sometimes occurs in panhysterectomies without infection but is more likely to occur in septic cases. Fistulæ are formed in separating adherent structures and in sloughing following trauma. Cases have been reported where adherent gauze used for drainage caused fistulæ. I have listed the complications found.

TABLE X.

Complications.

Suppurating abdominal wound	19
Tears in the intestines	3
Infected hematoma	1
Phlebitis	1
Urinary fistula	1
Rectovaginal fistula	1

Results.—The results of operative treatment for pelvic inflammatory disease are on the whole gratifying, if it be considered that the operations were not performed by the head of the department alone, but by his three assistants as well.

Tabulation of the results in the series shows:

Patients cured	149 or	74. 5%
Patients improved	38 or	19. %
Patients not improved	2 or	1. %
Patients died	11 or	5. 5%
Total		100.00%

The causes of death were:

Peritonitis	5 patients
Shock	2 patients
Miliary tuberculosis	1 patient
Postoperative hemorrhage	1 patient
Acidosis	1 patient
Acute intestinal obstruction	1 patient
Total	11 patients

The results of this analytical study would warrant the following brief conclusions:

First, pelvic inflammatory disease is most frequently caused by a gonorrheal infection. Sepsis following abortion and confinement is an important causal factor. Tuberculosis is not an uncommon agent in pelvic infections.

Second, pelvic inflammatory disease is greatly increased during the years of greatest sexual activity.

Third, gonorrhea is a most important factor in producing sterility.

Fourth, pelvic inflammatory disease is often the cause of secondary anemias in women.

Fifth, streptococcus infections often localize in the parametrial tissues. Gonococcus infections select the tubes.

Sixth, posterior colpotomy gives excellent results in acute cases.

Seventh, laparotomy, months after a colpotomy or when the condition is chronic, holds out the greatest hope of a cure.

723 Church Street.

DISCUSSION.

DOCTOR REUBEN PETERSON: Doctor Cummings' excellent paper represents a great deal of work and contains much information. So many points have been covered as to preclude detailed discussion, so my discussion will be general.

My mind carries me back to the early days of abdominal surgery in this country. While I cannot claim to have been among the earliest to begin abdominal work upon inflammatory pelvic disease, for that began in the middle eighties, I was among the first to take up the work in this state. The pioneer work in the treatment of pelvic inflammation by laparotomy was done by Joseph Price, of Philadelphia. He was a pupil of Tait's, and even came to surpass that master surgeon in the boldness and dexterity of his abdominal operating. Price revolutionized the treatment of pus-tubes, which up to that time had been badly treated by inadequate vaginal drainage. Wrong pathology was in vogue, for pus in the pelvis was thought to be due to pelvic cellulitis, when in reality it is due to tubal or ovarian abscesses. Price demonstrated conclusively before many hundreds of visiting surgeons that after the pus-tubes were enucleated through an abdominal incision, no inflammation of the pelvic cellular tissue remained.

As an intern in one of the Boston hospitals in 1888 it fell to my lot to wash out the pelvis through one or more drainage tubes in these inflammatory cases. When fluctuation could be detected in the posterior culdesac, the surgeon cautiously made a small incision and let out the pus. Then a drainage tube was pushed through this incision and the washing out process continued for weeks and sometimes for months. The trouble lay in the fact that the incisions were too small and the pus pockets were not opened into, with resulting inadequate drainage. I remember Joseph Price visiting this hospital in which I was intern and looking over these septic patients with one or more drainage tubes protruding from their vaginas. I remember with what horror and amazement the attending gynecologist heard his recommendation to remove these pus-tubes through the abdomen. At that time, in 1888, this was considered rank heresy since it did not coincide with the teachings of Thomas, Emmett, and other renowned gynecologists. Yet, within a few years, when the true pathology of pelvic inflammation

became known, everyone was removing pus-tubes through the abdomen and the vaginal incision was abandoned. We went too far for many of these pus cases should have been treated by posterior colpotomy and thorough drainage. Price was a master surgeon, dextrous, rapid, whose mortality after laparotomy in these pus cases was remarkably good. The qualities referred to above gave his septic patients a chance for their lives, whereas with prolonged operations the patients had very little chance,—I mean in bad cases where the patients were reduced by septic absorption, where they suffered from anemia, degeneration of the heart muscle and kidney. Price preached clean pelvic surgery, the removal of all diseased pelvic tissue and a careful toilet of the pelvic peritoneum. This was sound teaching for certain cases. The trouble was, it was too general; it went too far. We have seen from Doctor Cummings' paper how many of these pus-tubes are due to gonorrhea. While general peritonitis can follow contamination of the peritoneum with gonorrheal pus, this is rare. Such pus tends to become sterile. Hence the reason why a pus-tube can be ruptured during removal with escape of its contents through the pelvis and abdomen, yet no general peritonitis develop. But in a certain percentage of these cases there is a mixed infection; other germs are present besides the gonococcus. If such tube be ruptured the chances of general peritonitis are great. Now one cannot tell in advance which are the exceptional cases. Hence, it is dangerous to employ the abdominal incision in the presence of pus in the pelvis; a far better procedure is to drain the pus from below. In this clinic, if pus is suspected, the vaginal incision is employed. After such incisions and thorough drainage many of these women are completely cured. Others subsequently have to come to the radical operation, that is, removal of the uterus and appendages, but it is performed after the organisms have lost their virulence and the resulting mortality is not high.

The vaginal incision for pus in the pelvis is not as brilliant an operation as that performed through the abdomen, but it is safer and more women survive it. As stated above, later on the radical operation can be performed, if necessary, with comparative safety.

The detailed list of operations does not give a very good idea of what has been done. Many of them were for desperate cases, sent to the clinic after a number of unsuccessful operations. That is why the percentage, five and one-half, is so high. That and the fact that four men instead of one performed the operations. It must be remembered that this is a teaching clinic where operators, as well as medical students, must be educated. It seems to me highly satisfactory that this can be done with such a low resulting mortality in this class of cases.

Doctor Howard H. Cummings (closing): Regarding the frequency of gonorrheal infections, as shown by most statistics, I would say that there is a tendency for social workers to set the percentage too high. Sepsis following abortions and confinements stands second to gonorrhea.

The question has been asked whether the neuroses are common in

cases of pelvic inflammatory disease. Many patients suffering from pelvic infections show stigmata of hysteria and give evidence of neurasthenia. Hysteric patients should not be operated upon unless the pelvic lesion is a serious one, as their condition is often changed to one of traumatic neurosis. The neurasthenic patients, however, receive a great deal of benefit from the operation. The rest in bed, and the freedom from household duties for several months following operation often brings about a cure.

FOUR INTERESTING OPERATIVE CASES.

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I WISH to report briefly four interesting cases which have been studied in the surgical clinic during the past month.

ANKYLOSIS OF HIP-JOINTS TREATED BY MURPHY'S ARTHROPLASTIC OPERATION.

CASE I.—Mr. C., thirty-one, machinist, entered the hospital because of ankylosis of both hip-joints. Until the present trouble the patient had always been well. About ten or twelve years ago he had rheumatism in the right hip. He was able to be about but the hip was very sore. The trouble extended to the right knee, and then to the left hip, and all three were involved at the same time. The soreness remained in the knee for about a year and then disappeared. The tenderness in the hips was severe for two years and has continued to a lesser degree since that time. It is made worse by damp weather and exposure to cold. About two years after the beginning of his trouble he noticed his hips were getting stiff. This complication increased gradually until all movement in the hip-joint was gone. About six years ago the ankylosis was broken up under anesthesia, but promptly returned. The pain, however, has been less since that time. He has also had rheumatism in the shoulder and wrists at various times.

Examination.—Negative, except complete ankylosis of hip-joints with slight deformity. *X*-ray plate showed complete and very firm bony union between the femoral head and the acetabulum.

Treatment.—Arthroplastic operation on the left hip after the method described and practiced by Doctor John B. Murphy. Briefly stated this is performed by opening the joint through a "U" shaped incision with its base upward, sawing the greater trochanter from the femoral shaft, chiseling the femoral head from the acetabulum, smoothing the femoral head, and reaming out the acetabular cavity by special instrument devised by Doctor Murphy for that purpose, and interposing a flap of fascia lata between the head of the bone and its newly

formed socket. The several muscles are then reunited and the trochanter reattached by means of a wire nail, and the wound closed.

After the operation the patient was placed in a special splint with the operated limb in abduction and twenty pounds extension applied. The wound healed by primary union and at the present time, twelve days after the operation, the limb can be flexed and extended to a considerable degree without pain. The right hip will be operated upon in a few weeks, after which a fuller report of the case will be given..

* * *

CASE II.—Mr. O., aged twenty-seven, clerk, entered the University Hospital and was assigned to the Surgical clinic, June 16, 1913, complaining of pain in the right side and enlargement of the left scrotum. The family history was negative. When a child the patient had what was called inflammation of the bowels, but he cannot state the nature of the trouble. These attacks came about once a year until he was fifteen years of age; then he was perfectly well until the beginning of the present trouble three years ago. Three years ago he began having pain in right lower abdomen. This pain would come on suddenly, was sharp, knife-like in character and would last ten or fifteen minutes. Then it would pass off leaving a dull aching pain for three or four days. These attacks came on at irregular intervals, sometimes twice a month, and sometimes once in three months. He never vomited, but sometimes felt nauseated, and never noticed fever following an attack. The last was three weeks before entrance to the hospital and came on while walking to work; at this time he felt as though a knife had been thrust into his side. In this attack the severe pain came on every few minutes for two or three hours. The right side was sore for the remainder of the day. He is always constipated during the attacks, and has to take cathartics which afford him great relief. Between attacks the bowels move six or seven times a day. He has had a swelling in the left side of the scrotum for six or seven years for which he wears a suspensory.

Examination.—Negative, except rather diffuse tenderness over the right lower abdomen, and a rather marked varicocele.

Operation.—Right rectus incision employed. All the abdominal viscera normal in appearance except the ascending colon. Extending from the cecum to the hepatic flexure was a thin semitransparent, non-vascular membrane. This membrane was attached to the posterolateral parietal peritoneum and extended as an uninterrupted sheet a little beyond the central longitudinal band, at which point it seemed to fade out into tender fibrous bands which became lost in the peritoneal covering of the gut.

This membrane was ligated near its attachment to the parietal peritoneum and the remainder stripped from the colon as recommended by Doctor Jackson. This was accomplished with surprising ease, and

caused almost no hemorrhage. The removal of this band rendered the ascending colon very much more movable, making it possible to deliver it into the wound which was quite impossible before. The appendix appeared normal but was removed. That it was normal was confirmed by the pathologist.

The patient had an uninterrupted convalescence and during his stay in the hospital was entirely free from the pain and discomfort for which he entered.

* * *

CASE III.—Miss H., aged twenty, factory employe, entered the University Hospital for treatment in the Surgical clinic July 3, 1913. Her chief complaint was severe pain in the right side. Her father died of diabetes. Her mother is alive and well. The maternal grandparents both died of tuberculosis.

One morning about two years ago she got up with a pain in her right side. The pain was sharp, radiated to her back and toward her stomach, but not to the left side. The sharp pain gradually subsided to a dull ache. The right side was tender to the touch. For about a week she had such attacks of pain at frequent intervals and has continued to have such attacks at irregular intervals ever since. One year ago she had an attack rather more severe than the others and since that time the slight attacks are more frequent. During this severe attack she vomited a small amount at one time. During the attacks she was constipated, and was partially relieved of the pain by a cathartic. As long as she can remember she has never been able to lie on her left side because of pain in the right side. Never has had diarrhea, and never has had mucus in the stools.

On the morning of July 2, 1913, the patient was awakened from sleep by a sharp pain in the right side. This pain continued and sometime after she vomited, but did not have any rise of temperature. A physician was called, who administered morphin for the pain, and made a leukocyte count which showed 25,000 at that time. The pain continued and the patient was brought to the hospital the following evening. On entering the hospital her temperature and pulse were normal. Examination of her abdomen showed no distention, slight rigidity of the right rectus muscle, and a diffuse tenderness over the right side rather more marked about two inches below the costal margin. Leukocyte count 11,000.

Rectal examination was negative except that it revealed a completely retroverted uterus. The leukocyte count the following morning was 9,000, and the patient was more comfortable, although she still complained of considerable pain in the right side. During her second day in the hospital she complained of an acute exacerbation of pain which seemed very severe and caused the patient to double up in bed, and cry out at intervals. At no time during her stay in the hospital was her temperature above 99° or her pulse above 100. On account of the severity of the pain an immediate operation was decided upon.

Operation.—Right rectus incision employed. Except for a retroverted uterus the only pathology found was in the right abdomen. The appendix was congested and somewhat edematous, but not adherent. The cecum and lower portion of the ascending colon were filled with hard feces. From the cecum to the hepatic flexure was a thin veil-like membrane which was attached to the parietal peritoneum and to the ascending colon. In places this membrane was thickened so as to form a very distinct fibrous band which so constricted and kinked the gut as to form a partial obstruction. There were at least four of these kinks and the uppermost one, two inches below the flexure, produced such an angulation as to cause almost a complete obstruction. These bands were severed, the membrane removed as described in the previous case and the appendix removed. The pathologist reports a gangrenous appendix.

The recovery of the patient was uneventful although she complained of a great deal of pain immediately after the operation and still felt some of the old discomfort in her right side when she was discharged. After the operation she was able to lie on her left side without discomfort which, she said, had been impossible before.

* * *

CASE IV.—Mr. F., farmer, aged fifty-four, entered the University Hospital because of a sharp shooting pan and soreness in the lower abdomen. The family history is negative. Since boyhood until one year ago the patient has had frequent attacks of sick headaches, during which he vomited. The attacks ceased one year ago, due, patient thinks, to stopping coffee. He had a rectal fistula at the age of twenty. He was operated on for this condition at the age of thirty-five. He was well for several years, but the trouble has returned occasionally recently, and now he sometimes passes feces through the fistula. He has had some stomach trouble all his life. Some years ago he had frequent attacks of lumbago, which would sometimes keep him in bed for a week at a time.

The patient first noticed his present trouble about November, 1912. When working he had pain in the abdomen. This pain was quite generalized, but was not so severe as to prevent his working. His first severe attack came on the last part of February, 1912, while sawing wood. The pain was intense, shooting in character, and caused him to stop work and go to bed. The pain was localized in the midportion of the abdomen, and did not radiate. He found greatest relief lying flat on his back. He was unable to work for a month, but was not confined to his bed. His side was very tender, and any extra exertion would bring on the pain. The next severe attack began June 4, 1913, while lifting stone. This attack was much more severe than the former one. He was then confined to bed for two weeks. The pain was sharp and shooting and localized in the lower abdomen near the median line. Since that time he has been sore in the lower abdomen, and this soreness

is increased on exertion. He has never vomited during the attacks, but his appetite is poor at the time.

Examination.—Negative, except slight tenderness over lower abdomen, most marked near the median line.

Operation.—The appendix was about two inches long, the proximal inch being little more than a fibrous cord. The distal end was somewhat dilated and appeared to contain fluid. The appendix was bound down to the posterior parietal peritoneum by a very fibrous band but there were no other adhesions. The omentum was attached to the posterolateral parietal peritoneum throughout the entire length of the ascending colon. In places the omentum seemed to be attached directly to the peritoneum, in other places a thin nonvascular membrane intervened between the peritoneum and the omentum. This gave the appearance of a membrane which had been formed by a stretching out of the parietal peritoneum by the steady pull of the attached omentum. In places this membrane was attached to the colon and in others spread over it without any attachment. The omentum was freed and the appendix removed. The pathologic report was "chronic obliterative appendicitis."

DISCUSSION.

DOCTOR WALTER A. HOYT: A most interesting feature of these cases reported by Doctor Pettis was a peculiar postoperative symptom. Two of these patients developed within two to ten hours following operation, severe colicky abdominal pain. This pain was not like the typical postoperative gas pains but was more severe in character and was not relieved by stimulating enemas. The pain was severe enough in one case to require morphin hypodermatically and cause the patient to cry out. This was, however, relieved by early postoperative cathartics.

This, I think, can possibly be explained in two ways: In two of these cases was found a definite, partial, intestinal obstruction with masses of fecal material in the small bowel. Although these veil-like bands are not part of the peritoneum they are attached firmly enough, so that the freeing of them must cause some trauma to the ascending colon. The increased peristalsis that is set up, along with the passage of these fecal masses through the colon, it seems to me, is sufficient to account for the extreme colicky pains.

However after a thorough cleansing of the bowels these pains disappeared and the patients from this time on were free from all intestinal pains so prevalent before operation and directly following the freeing of these membranes.

DOCTOR REUBEN PETERSON: I do not want to be a doubter but I am far from being convinced that these bands Doctor Pettis speaks of are either so very common or give rise to many symptoms. I have opened two or three thousand abdomens and I must confess I have not found the condition spoken of although it is my custom to examine

carefully the cecum and gall-bladder when this can be done with safety. I am willing to be convinced and I shall have these bands looked for hereafter, even more carefully in my clinic. But surgeons are going mad just at present over the large intestine. They are taking it out and anastomosing it with everything,—in fact, taking all sorts of liberties with it. I have witnessed and shared in some of these furors over pelvic surgery in the past. This causes me to doubt the prevalence of, or at least the importance of these bands referred to. At least, I should think postoperative colic ought to be less rather than greater after the bands have been removed. Yet Doctor Hoyt seems to think it increased.

Doctor Mark Marshall: I read Doctor Jackson's article shortly after it came out, and I must say it seemed rather convincing. Doctor Darling has since had a number of cases showing the Jackson bands in which it seemed that the symptoms presented might be accounted for by the presence of the membrane over the colon. Inasmuch as it has been generally believed that chronic appendicitis may cause symptoms such as Doctor Pettis' cases have shown, and that two of the three cases he reports had diseased appendices, I do not believe that the Jackson bands should be looked upon as a necessary cause of the symptoms. I think the argument would have been much stronger if the appendices had been found normal.

Doctor Howard H. Cummings: I had an opportunity of examining the second patient reported by Doctor Pettis. Examination was for the purpose of eliminating the possibility of salpingitis. The extreme tenderness which he speaks of was not only confined to the right side of the abdomen, but the right vaginal fornix was extremely tender.

Doctor Pettis (closing): I can only answer Doctor Peterson by referring him to the recent literature on this subject. That he has never found these bands, can be attributed to the fact that he has explored the abdomen by touch and not by sight. That these bands or membranes really do exist, I think no one at the present time has a right to doubt. Whether these bands are of congenital origin, or are brought about by some pathologic irritation; and whether they give rise to clinical symptoms; and whether their removal gives relief from the symptoms attributed to them—these are debatable questions. The answer to these questions will come only after a large number of cases have been observed and treated. I have reported three cases, one of which I believe was a case of true membranous pericolitis as described by Doctor Jackson. The other two are described because of the interesting findings and because their study may throw some light on this interesting condition.

A REPORT OF A CASE OF CARCINOMA OF THE LARYNX, WITH COMPLETE LARYNGECTOMY, AND TWO CASES OF PAPILLOMA OF THE LARYNX, WITH THYROTOMY.

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I WISH to present three cases, operated upon by Doctor Canfield, showing two different types of laryngeal tumors, two benign and one malignant. The common benign tumors of the larynx which we have most often to deal with are papilloma and fibroma. Under this head we may safely classify singer's nodule, myxoma, and lipoma. In the malignant neoplasms we have chiefly to deal with carcinoma and sarcoma. We are not taking into consideration tumors due to tubercular or syphilitic causes. Of the benign neoplasms in our clinic, fibroma and papilloma are by far the most common; among the malignant growths carcinoma leads. The etiology of both these benign and malignant growths is very obscure. Fibroma, especially singer's nodule, is traced to improper approximation of the vocal cords, improper technic in singing and the continuous strain upon the cords by the singer trying to reach and maintain a high note beyond the expiratory effort. Hucksters, "barkers" and public speakers frequently have tumors of the papillomatous or fibromatous type. It has been our experience that tumors afflicting children are generally those to be classified under papilloma. These may follow chickenpox or some of the acute infectious diseases; also long continued laryngeal irritation and inflammation may bring about this condition.

The first two patients I wish to show tonight belong to the benign class, and are those of papilloma. One is a child of three years and the other a man of sixty-four. Clinically these two tumors are practically identical, covering the same anatomic position and causing the same symptoms. These papillomata are warty growths, generally pedunculated and diffuse. In both cases they were attached to the vocal cords, ventricular bands, base of epiglottis, and down into the larynx to the trachea. These can be distinguished from the fibromata which usually are single and instead of being warty, as the papillomata, are smooth, pinkish in color and generally oval. The fibromata are generally composed of hard, dense, connective tissue, covered with thin epithelium and instead of being pedunculated have a broad base. The condylomata are irregular, broad-based masses composed of hard hyaloid cells and are usually attached to the cricoid cartilage. The angioma, lipoma, and myxoma offer very little difficulty as regards differential diagnosis. The man's age led us to consider malignancy but the examination of his tumor clearly excluded such a diagnosis.

The first patient, Jacob H., aged three, was sent to Doctor Canfield nine months ago suffering from severe dyspnea. Examination at this time revealed the presence of many laryngeal polypi. On account of

the liability of sudden acute enlargement of this mass from one of many causes, it was deemed advisable to do a tracheotomy at once. The latter was made high on account of a persistent thymus, discovered at the time of the operation. It was deemed advisable to leave the tracheotomy tube in place for some little time with the hope that the tumor mass would reduce in size, if not disappear. It has been the history of many such cases that when the larynx is placed completely at rest, especially in the early stages of the disease, these tumors will disappear partially, if not entirely. Hence it was deemed advisable at this time to use this conservative method of treatment. The patient was sent home to a local specialist who in the course of nine months offered no further treatment, not even removing the tube which stayed in place for nine months without being cleaned.

The patient was brought back to the hospital May 26, 1913. On examination it was found that instead of the polypi disappearing they had become larger, completely filling the larynx and extending down into the trachea to the margin of the tube. Part of the mass was below the tracheotomy tube. The patient was given an anesthetic on the 27th and several pieces of the tumor removed from the region of the tracheotomy tube and from the trachea, the tube being replaced. The patient was discharged, as the parents were unable to leave the child in the hospital for a radical operation. This method of procedure was simply used as a palliative measure until such time as the child could be brought back for radical operation.

The patient returned on July 14, 1913. A thyrotomy was performed under general anesthesia, and a large tumor mass which completely filled the larynx and reached the trachea, was removed. The thyroid cartilage was split in the median line, the tumor mass was grasped and dissected loose with scissors, leaving a clean larynx throughout. The wound was scrubbed with absolute alcohol and packed with iodoform gauze. The tracheotomy tube was reinserted and the incision sutured. As you will see it was found necessary to reinsert the tracheotomy tube because this tumor bled very easily, so much so that it was necessary to pack the larynx. The patient made a good recovery from the anesthetic. On the third day the packing was removed from the larynx, the stitches also removed, and the edges of the wound supported with collodion; gauze and adhesive for primary union, the tracheotomy tube being still in place.

We expect to report a complete recovery eventually, but it will be some time before the tracheotomy opening will close. The tube will be removed in a few days and the edges of the tracheotomy wound freshened and made to heal if possible.

The second patient shows the same condition as did the first. Mr. H., aged sixty-four, mill hand, entered this clinic on account of hoarseness and extreme difficulty in breathing. The patient spoke in a deep whisper and was extremely cyanotic. The present trouble began

twenty-five years ago when he suddenly became hoarse. At this time he had no difficulty in breathing and his hoarseness became somewhat better. He has been more or less hoarse for the last twenty-five years until eight months ago, then the trouble became aggravated and he began to have difficulty in breathing and his voice was practically lost. The patient presented a picture of a patient during a very severe attack of asthma.

Examination revealed two wart-like growths, pedunculated and diffuse, in the midportion of the epiglottis on the convex side. The entire region of the false cords, true cords, aryepiglottic fold, was occupied by a large warty growth which appeared to have entirely closed the larynx. On deep inspiration a mere slit could be seen for incoming air. This was pinkish gray in color and not covered with mucus as one sometimes sees in carcinoma and tumors of tuberculous and syphilitic origin. The picture in this larynx and that in the child's were almost identical with the exception of a greater involvement in the man and the inability to see down into the larynx.

It was thought that it would be possible to remove this growth through the bronchoscopic tube. The larynx was cocainized thoroughly but during the cocainization the dyspnea increased and on insertion of the tube it became very marked so that it suddenly became necessary to do a thyrotomy and tracheotomy under cocain. Splitting the thyroid gave rise to a free profuse hemorrhage from the tumor itself. The latter completely filled the larynx and extended upward to the base of the tongue. On account of the profuse hemorrhage a cricothyrotomy with incision of the first ring of the trachea was performed. The tumor was then dissected out with scissors and forceps with more or less profuse hemorrhage. The wound was wiped with absolute alcohol and its upper portion packed with iodoform gauze. As before stated, it was our first intention to remove this endolaryngeal mass with a straight tube. It is fortunate that the attempt was not persisted in on account of the marked involvement and wide area covered by the tumor, as it would have been impossible to reach the entire mass by this method. The larynx in this case was so thoroughly invaded by the tumor that it was found absolutely necessary to dissect away most of the mucous membrane. The vocal cords were simply tumor masses. At the time of operation we discussed the possibility of the patient having the use of his voice. This seemed rather problematical at the time, but as you can see, the patient is heard more or less distinctly throughout the entire room. After a time he will have a rather respectable speaking voice of a deep, hoarse character. The packing was removed on the second day, the edges drawn together and the tracheotomy tube removed on the third day. This patient is having an uneventful recovery and should be free from a return during the rest of his life.

The last patient I wish to present is one with carcinoma of the larynx. Mr. W. J. B., aged fifty, occupation hay buyer. The patient entered the hospital on account of obstructed respiration and hoarse-

ness. He first noticed this trouble about three years ago when he became hoarse and consulted a general parctitioner near his home town who told him that he had a new growth in his larynx and advised operation. About two years after this the patient consulted his family physician who told him that he had tuberculosis. In the meantime there was slight change in his larynx until eight weeks ago when respiration became more difficult and the patient lost his voice completely. He did not cough, lost no weight, and did not have night sweats.

Examination showed a large nodular, irregular mass occupying the entire left side of the larynx infiltrating the aryepiglottic folds, base of epiglottis, and involving the anterior three-fourths of the right true vocal cord and posterior portion of the right side of the larynx. The mass was apparently firm, its free margin rough, nodular, and grayish white, with an inflammatory base. This mass could be freely felt in the larynx externally. Patient was extremely cyanosed and had great difficulty in breathing.

As soon as possible after his entrance into the hospital a tracheotomy was performed. This was performed under cocain and as a complete laryngectomy was the operation of choice later on, at this stage the isthmus of the thyroid was ligated and separated with the intention of completing the laryngectomy a few days later. It was found necessary to wait longer than we expected on account of an abscess which developed in the region of the thyroid. The tracheotomy was performed June 10, 1913, and on July 13, 1913, about a month later, a complete laryngectomy was performed. Under ether anesthesia a median incision was made extending from well above the superior portion of the larynx down to the suprasternal notch. On account of the difficulty in operating with the tracheotomy tube in place, it was found necessary to remove it. This, of course, increased the danger from hemorrhage and it became necessary to exercise great caution to prevent blood from entering the trachea. The larynx was dissected free from both sides, detached from the trachea and dissected upward from the esophagus to the base of the tongue and a portion of the epiglottis also removed. During the elevation of the larynx from the esophagus, the patient suddenly ceased breathing and voluntary respiration stopped for fifty-five minutes, after which time respiration became normal. During this time artificial respiration with inhalation of oxygen was practiced. During the time the patient ceased breathing voluntarily the operation was completed, masses of infiltrated tissue removed from the base of the tongue, the trachea brought forward and attached to the free edges of the neck wound and anchored with silkwormgut and the opening into the pharynx was sutured. The patient was returned to bed, and the foot of the bed elevated. He made an uneventful recovery from the anesthetic. The next day he was sitting up in bed and laughing. As you see now he is in excellent condition and should make an uneventful recovery.

REPORTS OF CASES.

REPORT OF A CASE OF BILATERAL PURULENT DACRYOCYSTITIS DUE TO SYPHILIS; ALSO A CASE OF CONGENITAL DERMOID GROWTH OF EACH CANTHUS.

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Department of Ophthalmology.

(INASMUCH as Doctor Parker was unable to be present, he has asked me to present the following cases.)

The first case is that of a boy, six and one-half years old, who first entered the University Hospital in May, 1911. At that time he came for a bilateral purulent dacryocystitis which had existed, according to the mother's story, since the child was about six months old. We believed the case was one of congenital obstruction of the ducts. These cases usually depend upon failure of complete absorption of the epithelial cord, which, as you know, in the embryonic state is developed from an ingrowth from the epithelial surface. Such cases are usually unilateral and are characterized by overflow of tears and attacks of acute dacryocystitis beginning shortly after birth. They are generally completely cured by the passing of probes, rupturing the occluding membrane. This child was treated in that manner, but, after prolonged probing, the treatment continuing many weeks, and failure to secure drainage, both the lachrymal sacs were removed, with a complete cure of the dacryocystitis.

In May, 1913, the child reëntered the hospital suffering from a severe attack of interstitial keratitis. The majority of cases of interstitial keratitis, as you know, are due to hereditary syphilis. The Wassermann reaction taken at this time was positive. Another child in the hospital at the time of this child's entry, suffering from a bilateral acute dacryocystitis with a similar history, was also found to have a positive reaction. It is believed that these cases of bilateral dacryocystitis and, often bilateral epiphora coming on without definite history, are due to a luetic process beginning in the nasal mucous membrane and occluding the ducts or setting up a periostitis at the lower end of the bony canal with the same result. Because of this belief it is thought best to postpone the removal of the sac until after the result of the antiluetic treatment be obtained. If after this treatment, the dacryocystitis continues, it will probably be necessary to remove the sac of this child also. One sac was removed before the Wassermann reaction was taken.

The lesson to be learned from these cases is that in all cases of bilateral epiphora or dacryocystitis coming on without definite history, a Wassermann test should be made.

* * *

The next case is that of a child referred to the Ophthalmic clinic from the Pediatric clinic. Examination showed the palpebral con-

junctiva normal in each eye. In the outer canthus of each eye there was a growth, larger in the right eye than in the left, which in the right eye overlapped the limbus for about two millimeters and in the left extended to within three or four millimeters of the limbus. The breadth of the growth in the right eye was somewhat larger than that in the left; both were adherent to the angle of the lids at the outer canthus. The growth was elevated about one to one and one-half millimeters, being slightly thicker in the right than in the left. The outer surface of each growth was somewhat uneven and in it with the loupe could be seen several minute hairs. A few similar cases have been reported. Examination has usually shown them to be dermoid in character; some have been classified as dermolipomata. They are not usually cystic in character.

Because of the large size of the growth in the right eye and the fact that it extended for some distance onto the cornea, and because of the fact that these growths sometimes increase in size, it was thought best to remove as much as possible of this growth. Accordingly an incision was made in its surface and the interior of the growth was dissected out, as much as possible being removed from the corneal end. The eye now looks very much better and the expectation is that cicatricial contraction will reduce its size sufficiently to cause the cornea to remain clear. After puberty, growths in this situation have not usually increased in size, and for this reason, unless they involve the cornea, a removal is not usually advised.

A small portion of the specimen was sent to the Pathologic laboratory. Their report was: dense hyaline fibrous connective scar tissue containing few cells; two small conjunctival glands; no neoplasm. Had the surface portion of the growth been sent, especially some of that portion which contained the cilia, which could be seen with the loupe, probably the pathologic report would have been slightly different. These cases are of more than common interest because of their extreme rarity and of their peculiar characteristics.

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